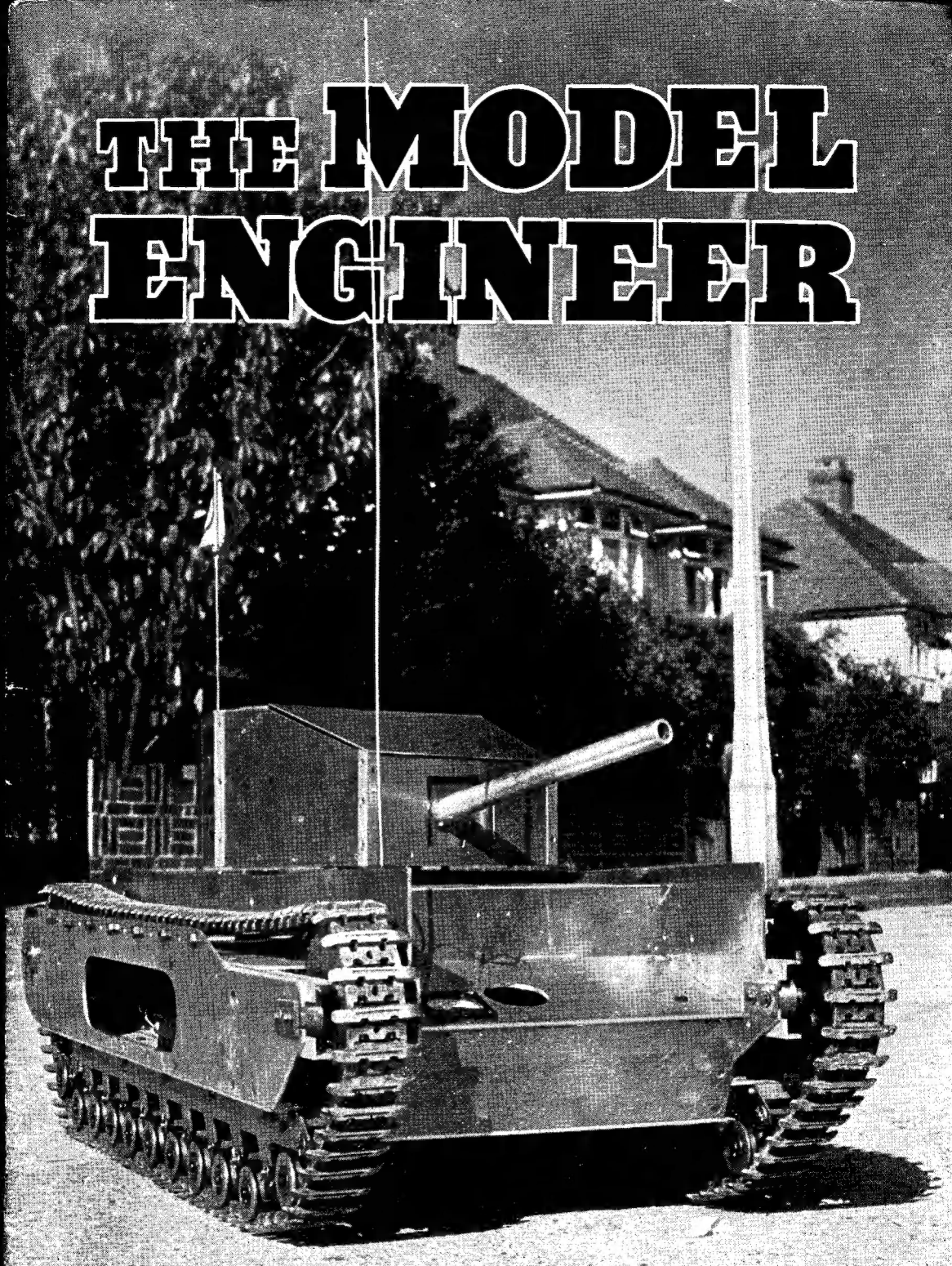
THE MODEL ENGINEER



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The MODEL ENGINEER

PERCIVAL MARSHALL & CO. LTD., 23, GREAT QUEEN ST., LONDON, W.C.2

30TH AUGUST 1951 VOL. 105 NO. 2623

SMOKE RINGS

British Boats' Triumph

● WE WERE delighted to receive a postcard from Mr. G. H. Stone to let us know of the result of the Swiss International Race for power boats. The coveted Hispano Suiza Cup has been won by Mr. Stone himself with his *Lady Babs II*, at 76 m.p.h. Mr. Phillips's *Foz II* was second at 69 m.p.h.

The same two boats in the same order provided the result of the race for the Ford Cup, *Lady Babs II* winning at 74.5 m.p.h. and *Foz II* at 65 m.p.h. Each boat was fitted with silencer and knock-off switch.

We congratulate both Mr. Stone and Mr. Phillips most heartily on these successes. There is evidently something in that lake at Geneva that suits the British boats.

Exhibition at Marlow

● THE MARLOW Society of Model Engineers held its first exhibition from August 9th to 11th, at the Church Hall, Marlow, Bucks. In view of the fact that the society is, as yet, less than twelve months old, the display was a most attractive one and a credit to all concerned. The ship section was the strongest and most comprehensive; some excellent work was to be found in it, covering a wide variety and period of ship development. One exhibit alone consisted of a complete collection of water-line miniatures of Cunard steamships illustrating the development from the earliest to the latest.

Vertical and horizontal steam engines of various sizes were represented, and a well-designed small home-made lathe of robust construction attracted much attention.

Some unusual antiques caused considerable interest; a jewel-casket and a ship's chest, each with a five-bolt lock and dating from about Elizabethan times, were well worth close examination, in spite of the somewhat crude workmanship.

Periodical musical interludes were provided by a fine old musical box and an ancient German musical clock in the form of a man playing a hurdy-gurdy; at each hour, this clock played a little tune with most pleasing effect.

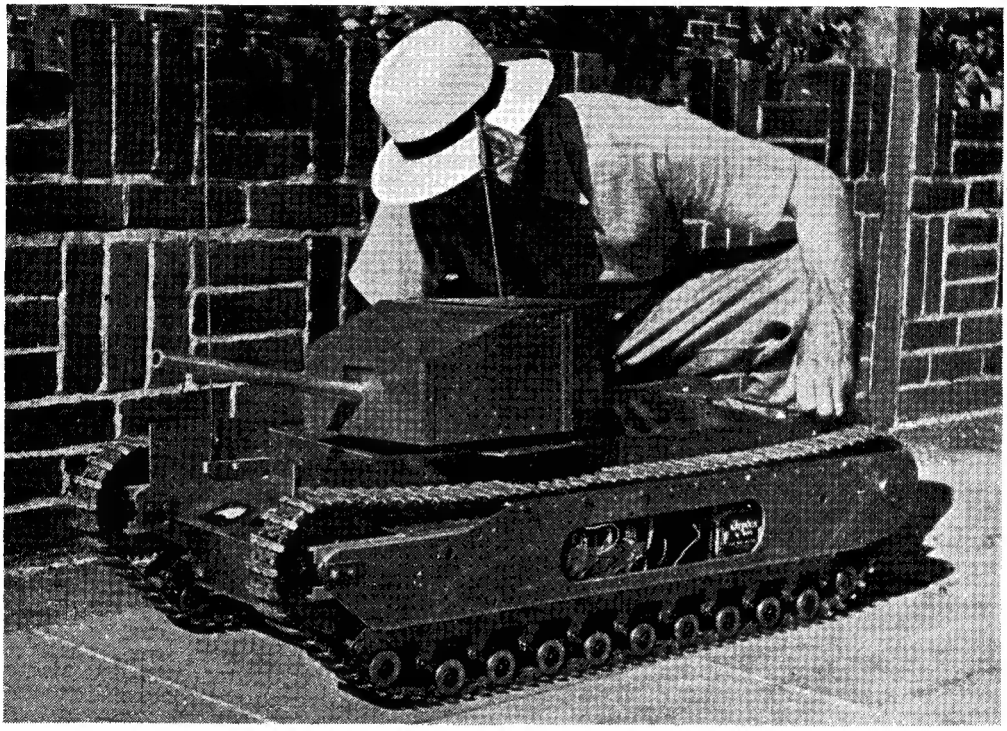
A 7¼-in. gauge "Midge" locomotive was running on a short length of track laid outside the hall, while a complete "O"-gauge model railway layout formed the centre-piece of the exhibition inside.

No doubt, as is usual with first exhibitions, the organisers learnt some lessons which will be duly applied to future efforts of the kind; but we offer our congratulations to the society for an admirable first attempt.

Our Cover Picture

● JUST IN case the photograph on the cover gave you the wrong impression, here is another view of the same model from a slightly different angle, showing the designer-builder, Mr. A. T. Tamplin, carrying out a routine check.

This is the model of the Churchill tank (before it received its coats of paint and final trimmings) which opened this year's " M.E." Exhibition.



Its performance is quite remarkable, and despite its weight of well over 2 cwt., it can be handled with remarkable precision. The turret is fully operable, and the gun is capable of firing six rounds without reloading. It is probably the first model of its type in which full control of all the manoeuvres possible in the full-size tank has been successfully achieved.

A Rare Accident

● RECENTLY, AT a worsted spinning mill near Halifax, Yorks, there occurred a boiler accident of a kind which, to say the least, is rare ; moreover, the explanation, at the moment of writing, is still being sought.

Just before 7 a.m., people living in the neighbourhood were puzzled to hear the sound of violently escaping steam proceeding from the mill ; workpeople arriving at the mill discovered that the boiler had blown one of its safety-valves. The escaping steam lifted slates from the boiler-house roof, hurling them into the mill yard and across the road into the doorway of a shop ; one of the valve's counterweights was blown through a window. Fortunately, nobody was hurt, but there was no work at the mill that day.

The boiler had not long before been given a hydraulic test, during which the safety-valves had been reseated ; at the time of the mishap, the steam pressure was 100 lb. p.s.i., 10 lb. below the normal working pressure, which makes the accident all the more difficult to explain. The safety-valve, when recovered, did not appear to be damaged at all, but there is no need to mention that it has not been used since ; the boiler is working temporarily with only one safety-valve.

The Birmingham Rally

● FURTHER TO the announcement of the National Locomotive Rally to be held at Campbell Green on September 8th and 9th, we have been asked to add that, as previously, the Birmingham Society of Model Engineers will be awarding a silver medal to the owner of a 3½-in. or 5-in. gauge locomotive who brings it the greatest distance to the rally. There is also a cup for the locomotive which scores the most points for (*a*) performance and (*b*) general workmanship and appearance.

An important condition under which any locomotive will be run is that the society's insurance company requires that all boilers under steam must have undergone hydraulic tests and been examined by a competent engineer within the previous twelve months. Certificates of test and examination should be produced.

WHAT TO SEE

AT THE 1951 " MODEL ENGINEER " EXHIBITION

*General Engineering Section

AN outstanding example of design and construction is the six-cylinder twin overhead camshaft engine of Mr. F. W. Waterton, of Stretford, who is also one of the model power boat fraternity. This engine has a bore of 0.75 in. and a stroke of 0.7 in. giving a total capacity of 30 c.c. It has a seven-bearing crankshaft, drilled for forced lubrication, and timing pinion integral with the shaft. All main and big-end bearings are split. The camshaft and magneto drive is by a train of spur gears. Lubrication is supplied by gear pump driven from the crankshaft, feeding all main bearings. A mechanically compensated float-feed carburettor, with a throttle of the barrel type, is fitted, and a two-pole rotary magnet magneto, incorporating a H.T. distributor, provides ignition. This engine is said to have run quite satisfactorily, and it is intended at a later date to fit it with a clutch and reversing gearbox for use in a prototype model boat.

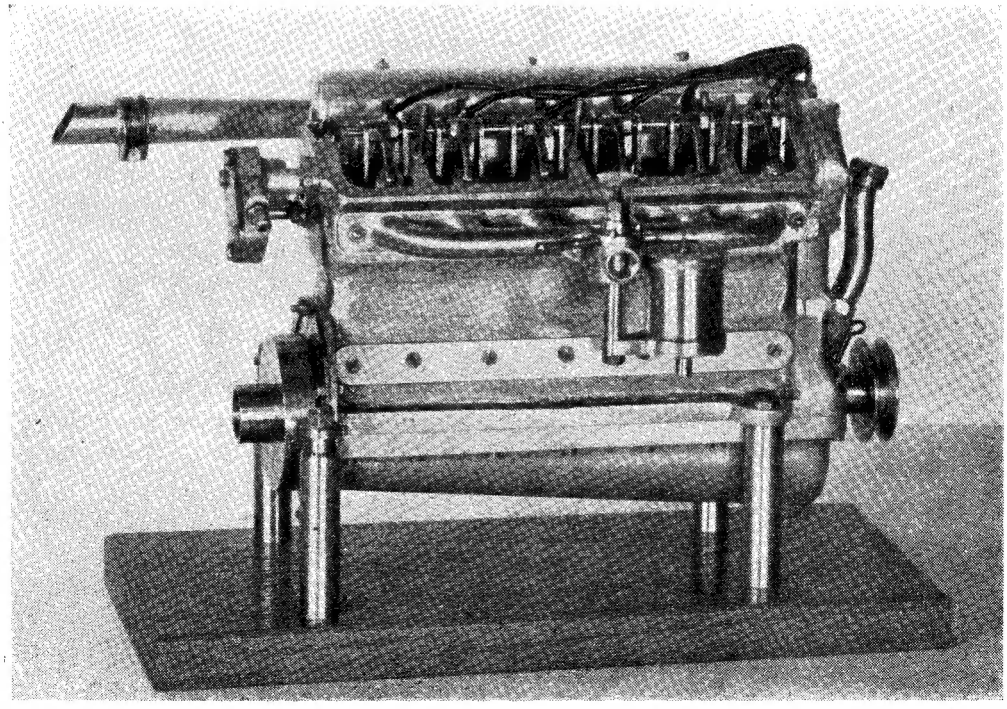
*Continued from page 269, " M.E.," August 23, 1951.

Tools and Workshop Appliances

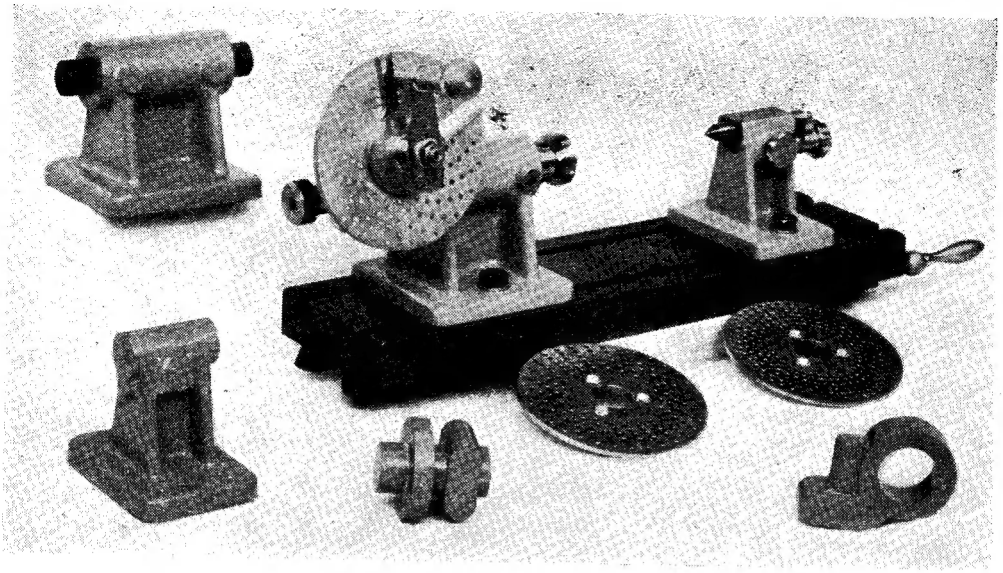
An interesting free-lance lathe is exhibited by Mr. W. D. Urwick, of Taplow. This incorporates the unusual features of a rising and falling bed, a patented form of gib key for preserving alignment of the sliding surfaces, and also an independently supported tailstock. All patterns were home-made. The weight of the complete lathe is ½ cwt., the dimensions being 39 in. × 30 in. × 51 in.

Mr. A. G. Hann, of Penzance, contributes a set of wooden patterns and coreboxes for a triple-expansion marine engine of his own design. This was a first attempt at pattern making, and is made from scrap timber.

Mr. A. E. Bowyer-Lowe, of Letchworth, exhibits a very useful accessory for a small milling machine, namely a dividing head incor-



Mr. F. W. Waterton's six-cylinder, twin o.h. camshaft, petrol engine



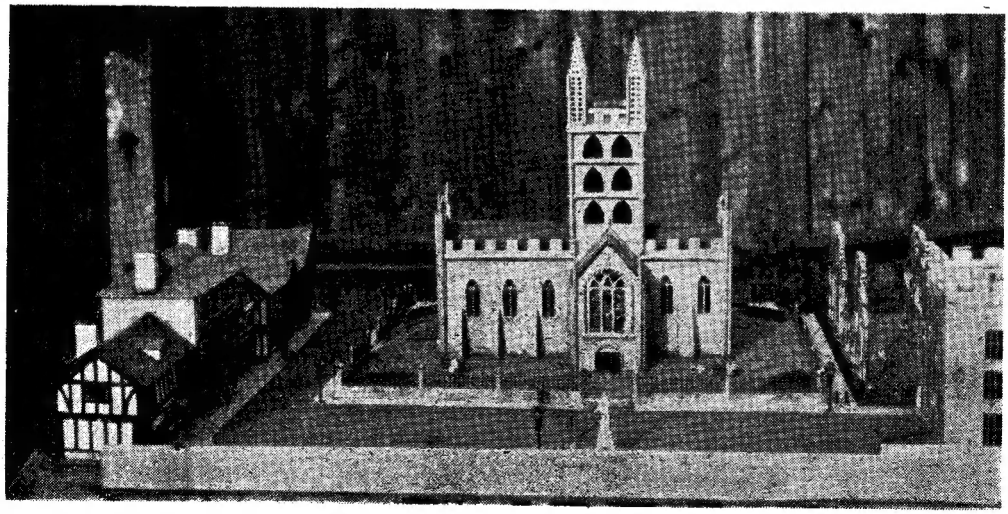
A dividing head for a Pools milling machine by Mr. A. E. Bowyer-Lowe

porating a 40:1 worm reduction gear, with three division plates. Each has six rows of holes, to give a wide range of divisions. The centre height is 2½ in. and it is adapted to fit a Pools milling machine, a tailstock being provided for supporting the work between centres. The design is original, and patterns are home-made.

A rotary dividing table, graduated to read down to increments of 2 minutes of a degree, is exhibited by R. R. Watson, of Radlett, and a small precision lathe, with built-in milling and dividing heads, and screw-cutting gear, by Messrs. W. Fowkes and R. Turner, of Matlock Bath.

Scenic Models

An interesting exhibit in this section is the model of a cathedral close by Mr. D. C. Oehl, of Ruislip. This forms a section of a collective model town known by the fictional name of "Barryport," as part of a very extensive model railway layout. The cathedral which it depicts is an imaginative conception, which is supposed to have stood on the site of an abbey dating back to the eleventh century, the ruins of which can be observed, enclosed in railings, and in excellent state of repair. The cathedral itself is of the Norman period, and it is fitted with stained glass

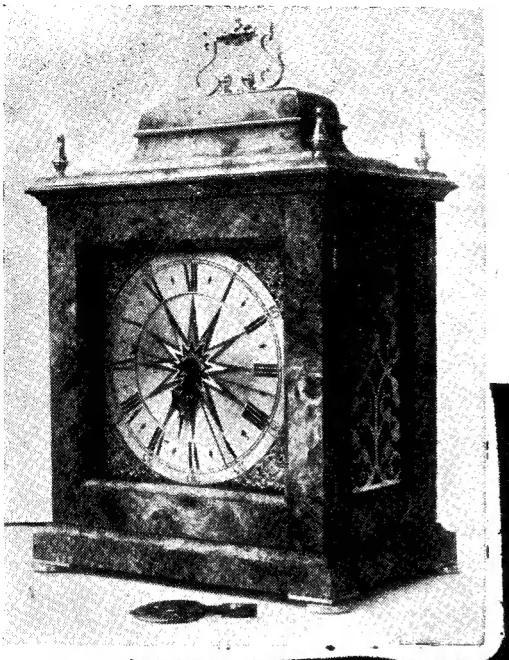


Mr. D. C. Oehl's imaginative model of a cathedral close

windows which can be internally lit up, giving a very picturesque effect in subdued exterior light.

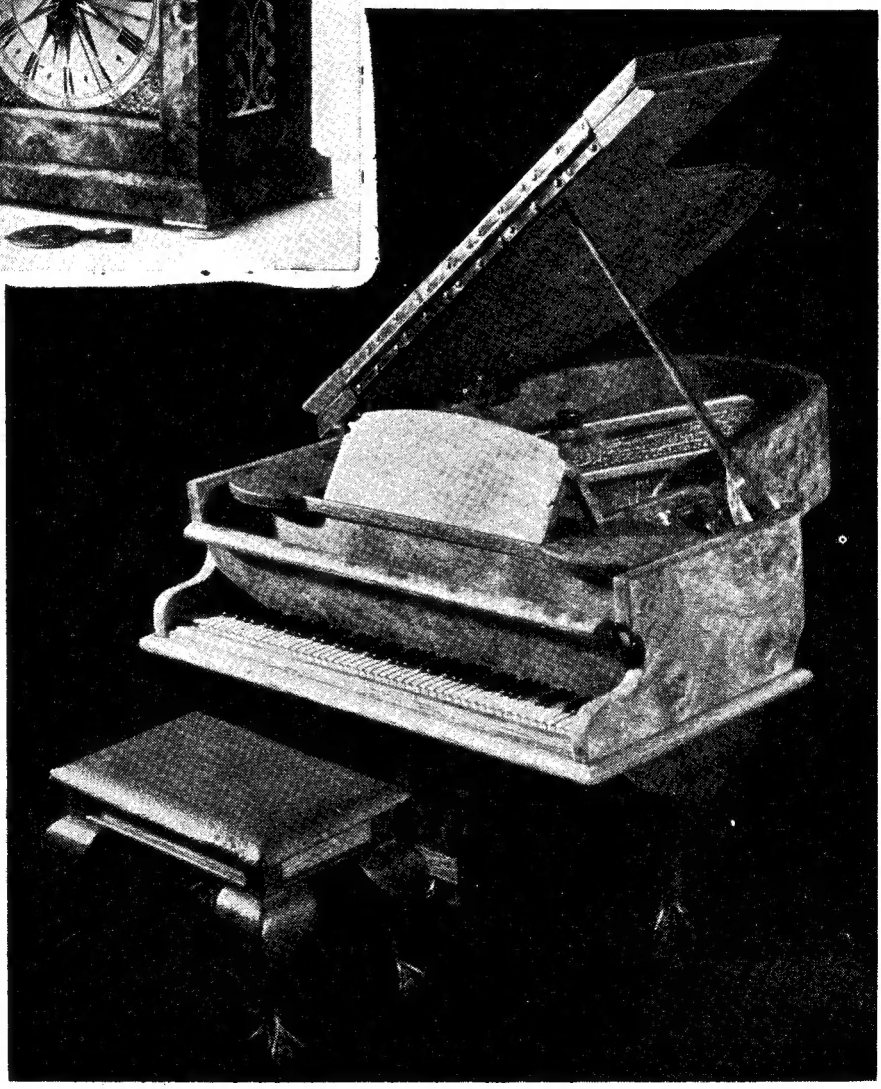
Mr. A. J. Robert, of London, W.9, exhibits a model of a modern railway station in an old-fashioned setting.

A working model of a signal cabin, with signals for one station, up and down road and branch line, with Sykes type lock and block instruments and repeaters, all made to work, is exhibited by Mr. S. W. Pearce, of Sutton, Surrey. A model of a Sussex windmill, including interior working fittings, is contributed by Mr. D. A. Dubbin, of



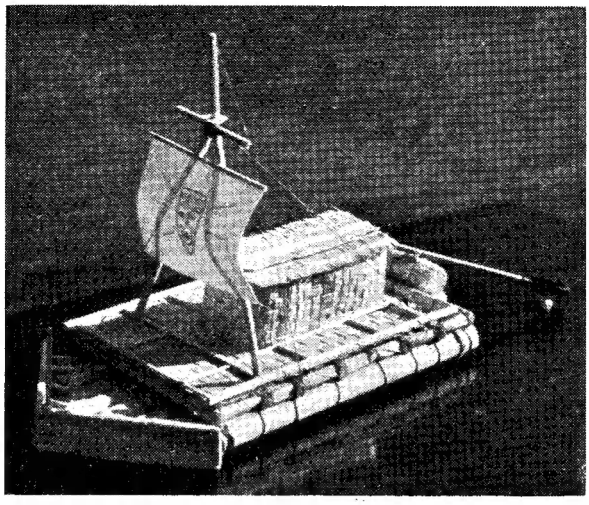
Left—Mr. C. B. Reeves' bracket clock

Below—A model of a grand piano, in Italian burr walnut by Mr. J. H. Starck



Fulham, S.W.6, and a model of a typical English village, to an approximate scale of 2 mm. to 1 ft., containing as many of the traditional objects to be seen in an English village as possible, by Messrs. V. S. and B. Wright, of Hillingdon. A group of four models, namely Cleopatra's Needle, the Eros Fountain, the Cenotaph, and Nelson's Column, are entered by Mr. V. H. Washer, of London, E.C.3.

Vehicle models in this section include six models of London Transport Buses, by Mr. G. Stanley, of Upton Park, E.13, and a group of post-war double-deck buses by Mr. C. J. Durham, of Gravesend.



A reconstruction model of the raft used on the Kon-Tiki expedition, by Master D. Allinson

Horological and Scientific Section

Mr. C. B. Reeve, of Hastings, is one of our "hardy annuals," who rarely fails to produce something of outstanding merit in horological work. On this occasion, he exhibits another exquisite bracket clock, 15 in. high by 12 in. wide, and weighing 20 lb. The motion is of the spring-driven fuse type, with full striking gear, and the illustration will give a better idea of the very fine work put into the exterior part of the clock, than any written description.

General Craftsmanship

This section includes a good deal of work which is not usually classified as model engineering in the true sense, although admissible within the scope of handicraft. A typical example is the inlaid wood picture made by Mr. G. H. Wilkins, of Sheffield. This is made of nine different woods, namely, oak, mahogany, walnut, sycamore, ash, teak, padouk, haldu and polawis, all in pieces $\frac{1}{16}$ in. thick, cut out with a fret-saw, and mounted on a piece of $\frac{5}{16}$ in. plywood. The carved wood box by Mr. R. G. Hutson, of Hounslow, and the two low relief wood carvings by Mr. G. Gibbons, of Lymington, also come into this category. Mr. R. G. Dodge, of Liskeard, exhibits a case of miniature wood working tools, overall dimensions $7\frac{1}{8}$ in. × $3\frac{1}{2}$ in. × $1\frac{3}{8}$ in., and Mr. R. Clements, of Birmingham, contributes a model of a modern car of his own design, 29 in. × $10\frac{1}{2}$ in. × 8 in.

Excellent workmanship and ingenuity are both apparent in the model grand piano by Mr. J. H. Starck, of Ruislip, which is constructed of Italian burr walnut, and contains an automitic musical movement; and the model stage by Mr. J. W. Witham, of Reading, which is complete with scenic effects and coloured lighting, and also arranged for projections of films from the back.

Junior Section

In recent "M.E." Exhibitions, the junior section has produced some examples of work which have been "eye-openers" to some of the old hands, and we trust that this tendency will be shown in the present exhibition. The favourite type of model in this section is the old-time or water-line ship model, and some examples entered are the waterline models of an oil tanker, to a scale of 1 in. to 100 ft., and the cargo liner *Harbledon* to a similar scale, by 15-year-old N. W. Sitwell, of Haslemere, and a model of H.M.S. *King George V*, to a scale of 1 in. to 50 ft., by 13-year-old J. Briant, of Kingston-on-Thames. Ten-year-old D. J. S. Allinson, of Newbury, exhibits a reconstruction model of the raft used by the Kon-Tiki expedition, to a scale of $\frac{3}{4}$ in. to 1 ft.

Additional Entries

In addition to the models described above under the various sections, details of a number of other models have been received too late for classification. These include a model of a B.L. 8 in. howitzer by Captain J. D. Adamson, a portable agricultural traction engine by B. D. Ferguson, and a low-loading meat transporter chassis by D. S. Black, in the general engineering section.

Messrs. A. J. Kent and F. H. Tapper, who have in previous exhibitions shown some very interesting portable engines, have on this occasion turned to a rather different class of model in the Tangye gas engine, period 1890 to 1900.

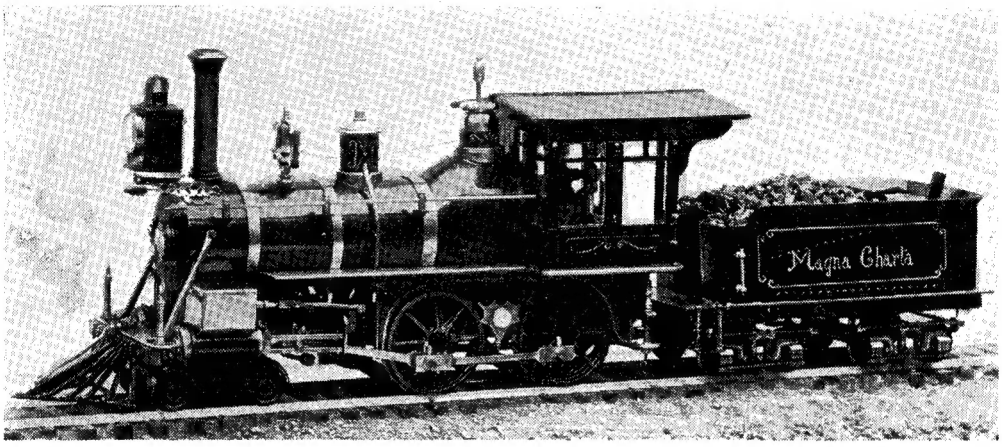
In the small tools section, Mr. K. N. Harris exhibits a very interesting machine for engraving indices and other forms of protractor scales; and other machine tool appliances include an adjustable boring head by R. E. Priestley, and a rotary milling table by W. J. C. Truscott. A $2\frac{1}{4}$ in. back-geared screwcutting lathe is entered by G. D. Reynolds, and micrometers by E. A. Searles and W. H. Balshaw. E. H. Knight exhibits a light shaping machine.

Among the scenic and representational models, there are two dioramas of marine subjects by G. F. Campbell, a model of St. Andrew's Church, Gravesend, by the Gravesend Aeromodelling Club, the gate-way and gate-house of St. Batholomew's Church, Smithfield, by L. G. Seymour, and a church bell by A. F. Lewry.

*Steam Locomotives

AN unusual note is sounded, metaphorically speaking, by the ½-in. scale American 4-4-0 locomotive of about 1875, made by Mr. V. Hotchkiss, of Egham. This is another "first attempt," and took two years to make. We do not often see locomotives of this kind or period, and we think visitors will be as interested as we are in this one.

Two more "first attempts" are of much interest; one is a 1¾-in. gauge, 10-mm. scale, 4-6-2 locomotive, coal-fired. This would seem to be an ambitious and unusual little engine and is the work of Mr. T. G. Merriott, of Rainham. The second of the two is a 2½-in. gauge "Dyak" 2-6-0 by Mr. R. H. Pilcher, of London, W.C.2.



Mr. V. Hotchkiss provides something unusual with his ½-in. scale American old-time locomotive

A 3½-in. gauge "Rainhill" type of engine by Mr. R. P. Holdstock, of St. Leonards-on-Sea, is notable for the extremely attractive neatness of workmanship and finish, to judge by its photograph. There have been many examples of this highly entertaining engine, but we think that few have achieved the precision of outline seen in Mr. Holdstock's; moreover, it is, like several other entries this year, a "first attempt."

Mr. Thomas Shott, of Headington, shows a 3½-in. gauge *Duchess of Buccleuch*, L.M.S.R. 4-6-2 engine, which has occupied his spare time for 6 years and 9 months. He has endeavoured to make his model as perfect as possible, by working to drawings kindly supplied by the L.M.S. Railway company, visiting Camden Sheds three times and Euston Station at least fifteen times in order to obtain information about many details.

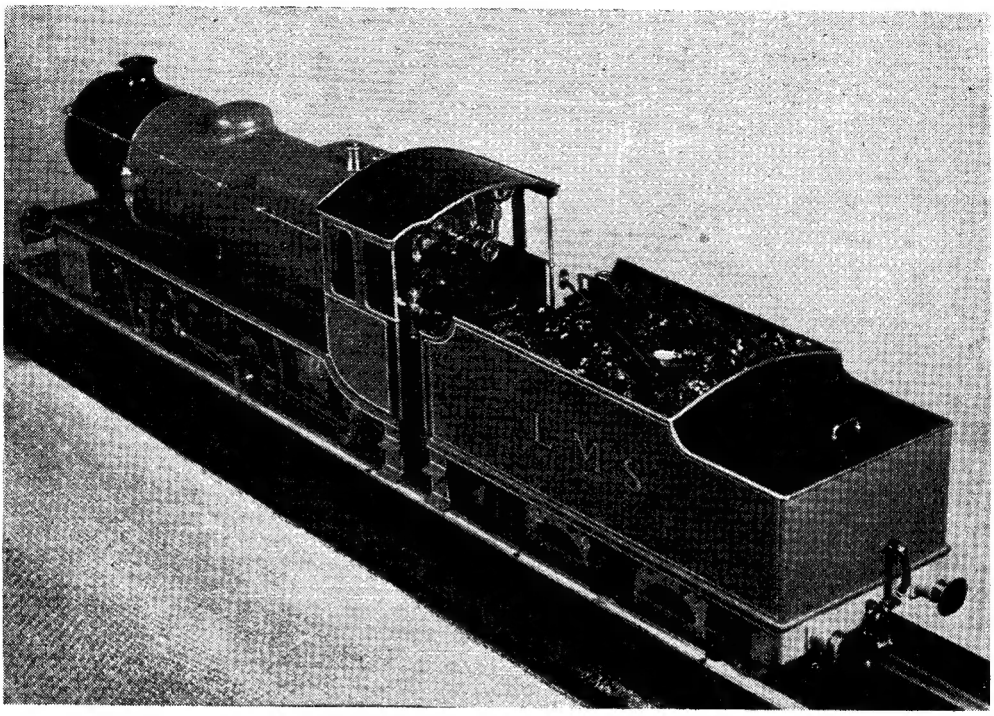
A 3½-in. gauge G.W.R. "King" class locomotive, lined and lettered in the pre-war G.W.R. colours, built by Mr. J. Refoy, of Windsor, is a job of the kind that we have come to expect from this particular competitor. Practically every detail of the prototype is reproduced to scale, and every nut and bolt was home-made because nothing suitable was otherwise available. About 9,000 hours, spread over twelve years, have been occupied in the construction of this fine model.

A father, competing with his son, or vice versa according to the point of view (!), is demonstrated by two ¾-in. scale models of the rebuilt Pacific engine, *Great Northern*, of the Eastern Region of British Railways. One of these was built by Mr. S. G. Thorold, of Greenhithe, and the other by his 16-year-old son, J. W. Thorold. For the moment, we will leave it for our visitors to amuse themselves by trying to decide which is which! The labels attached to the models should not be read until after the decision has been made, of course.

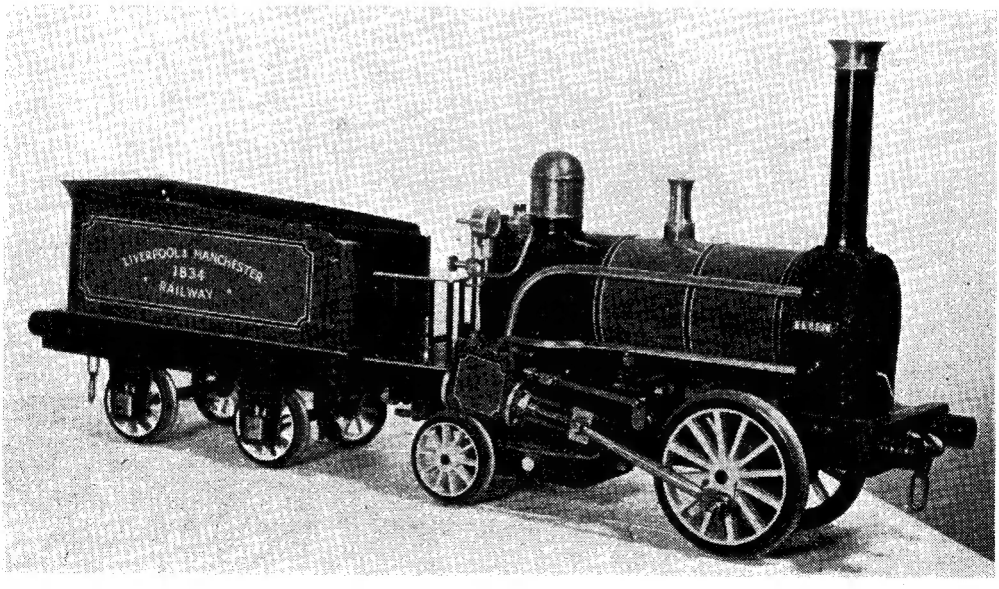
A 2½-in. gauge L.N.E.R. *Flying Scotsman* by Mr. J. B. Kent, of Barking, is of interest because, although it is built from a set of commercial parts, it is its builder's first attempt at a locomotive; he states that he knew nothing about locomotives or models when he began it. He spent three years on it and added brakes and a mechanical lubricator. From its photograph, it appears to be a very neat piece of work, and Mr. Kent is evidently possessed of plenty of patience, as he reports that many snags were encountered and overcome during the construction of the model.

A 5-in. gauge locomotive which provides a striking contrast to the great majority so far built for this gauge is the work of Mr. A. D. Pole, of Harrow. It is a very true-to-scale reduction of the old L.N.W.R. 8 ft. 6 in. 2-2-2 type engine

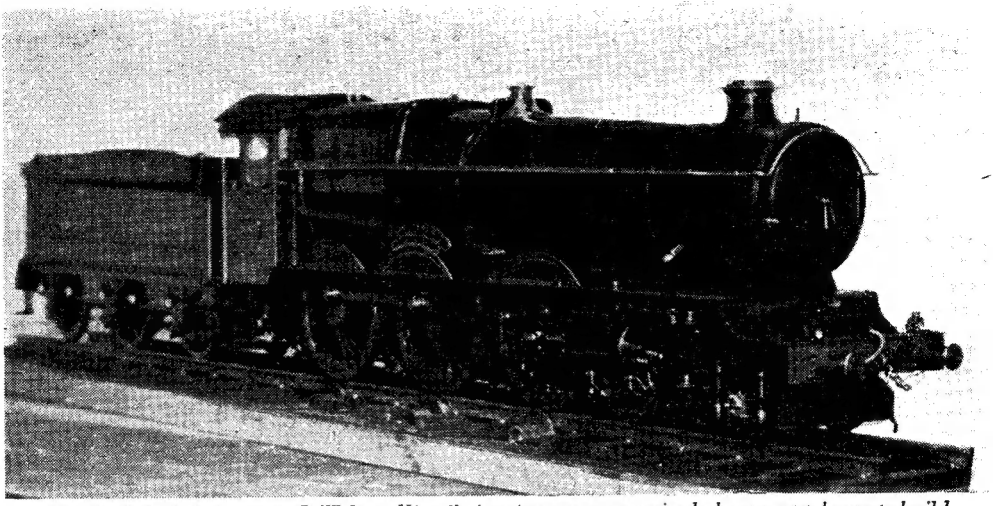
*Continued from page 271, "M.E.," August 23, 1951.



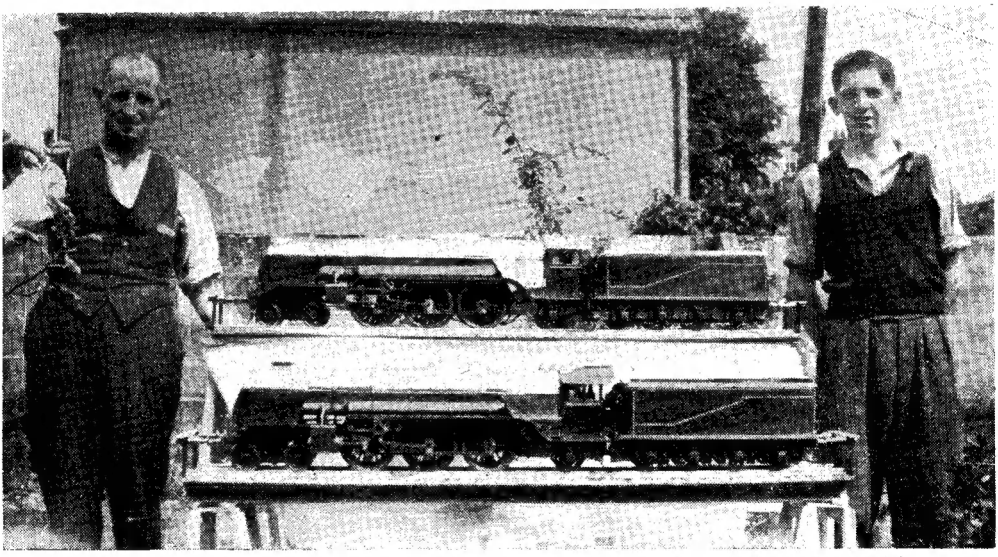
A 2½-in. gauge "Dyak" by Mr. R. H. Pilcher appears to be a very neat "first attempt"



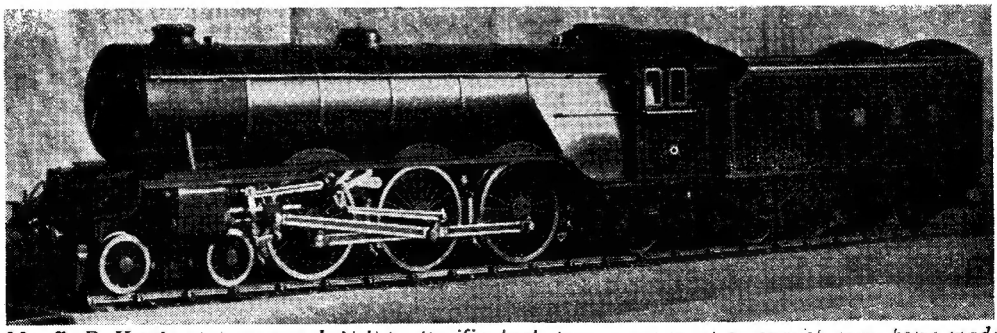
Mr. R. P. Holdstock's "Rainhill" is another very neatly finished "first attempt"



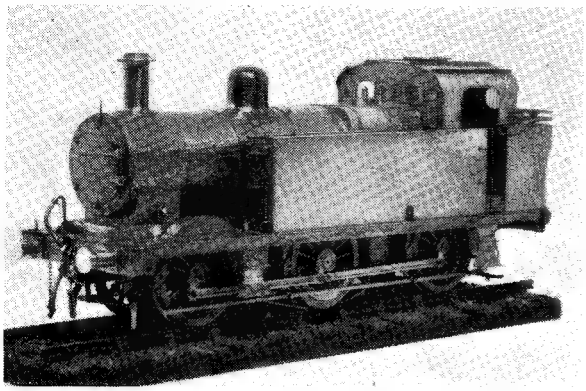
Mr. J. Refoy's ¾-in. scale G.W.R. "King" class locomotive required about 9,000 hours to build



Mr. S. G. Thorold and his son J. W. compete with each other! Who built which?



Mr. J. B. Kent's 2½-in. gauge L.N.E.R. Pacific, built from commercial parts with some home-made additions and alterations



A remarkable 7-mm. scale L.M.S. 0-6-0 tank locomotive by Mr. F. H. Higgs

Cornwall; not the kind of locomotive that would appeal to many enthusiasts, but all the more interesting for that reason. We understand that, within the limits of its capacity, it has proved to be quite satisfactory on the track.

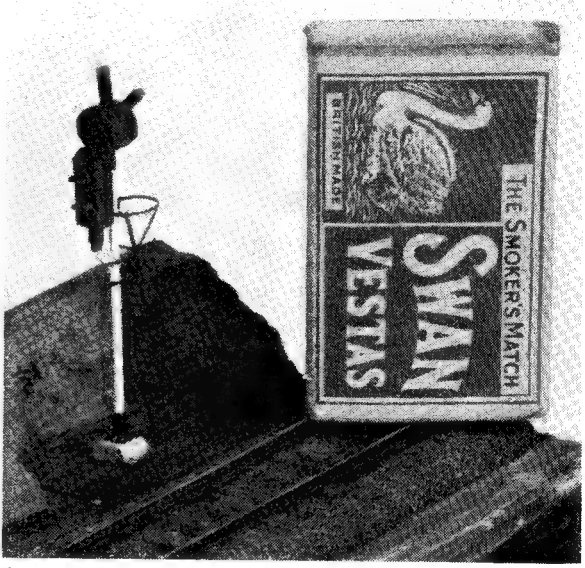
A praiseworthy attempt to produce a "O"-gauge steam locomotive which is, at the same time, a satisfactory working job and a true-to-scale reduction, externally, of its prototype, is to be seen in the little L.B.S.C.R. E5X class 0-6-2 tank engine made by Mr. W. F. Gentry, of Bristol. The easiest way to ensure success in a model of this kind is, obviously, to avoid choosing a complicated prototype; we think that there could hardly be a better combination of simplicity and massiveness than in these E5X tank engines.

The Model Railway Section

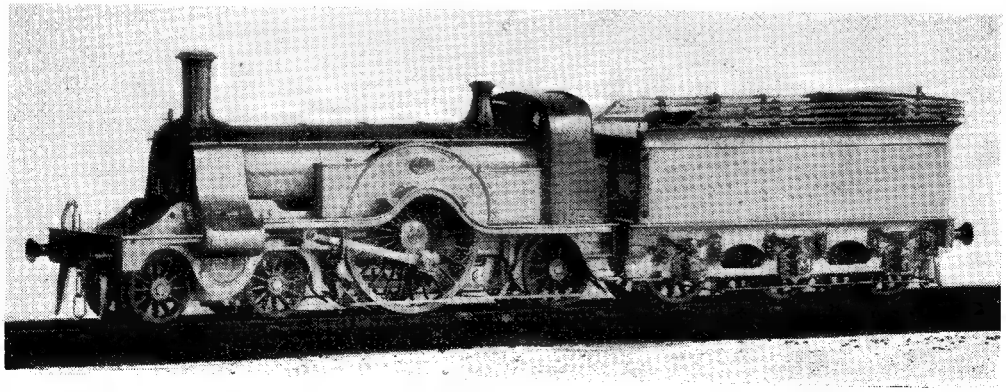
The small-gauge model railway exhibits contain some very attractive work. Mr. F. H. Higgs, of Shepperton, exhibits a 7-mm. scale L.M.S. 0-6-0 tank locomotive which is remarkable for the amount and accuracy of minute details.

A 4-mm. scale *working* colour-light signal with junction indicator, made by Mr. T. E. E. Hunt, of London, S.E.5, is one of those ever-fascinating examples of real miniature work that are setting a commendable standard in the model railway hobby. Often a considerable amount of ingenuity is required to achieve a realistic effect without departing from true-scale dimensions.

Mr. A. C. Pitman, of Winchester, is an 18-year-old bank clerk, who is at present serving in the Royal Artillery. From pieces of wood, cardboard, and



A 4-mm. scale working model colour-light signal with junction indicator



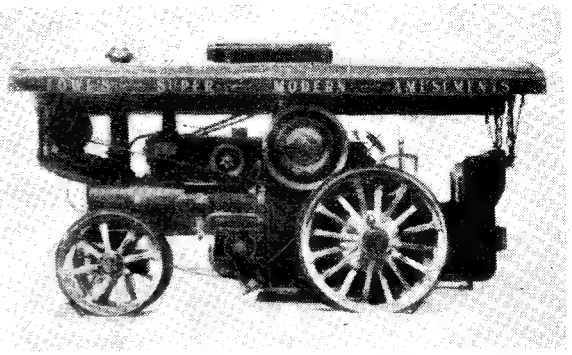
A splendid 4-mm. scale Stirling "8-footer" by Mr. F. Reynolds

paper, and working only with razor-blades, scissors and tweezers, he has made a remarkably accurate representation of a Southern Region " Merchant Navy " class 4-6-2 engine and tender to the scale of 2 mm. to 1 ft.

A 4-mm. scale *ex*-Cambrian Railway composite corridor coach built by an architectural student, Mr. A. J. Mathieson, of Leeds, is something rather different from the usual run of main-line coaches for model railways.

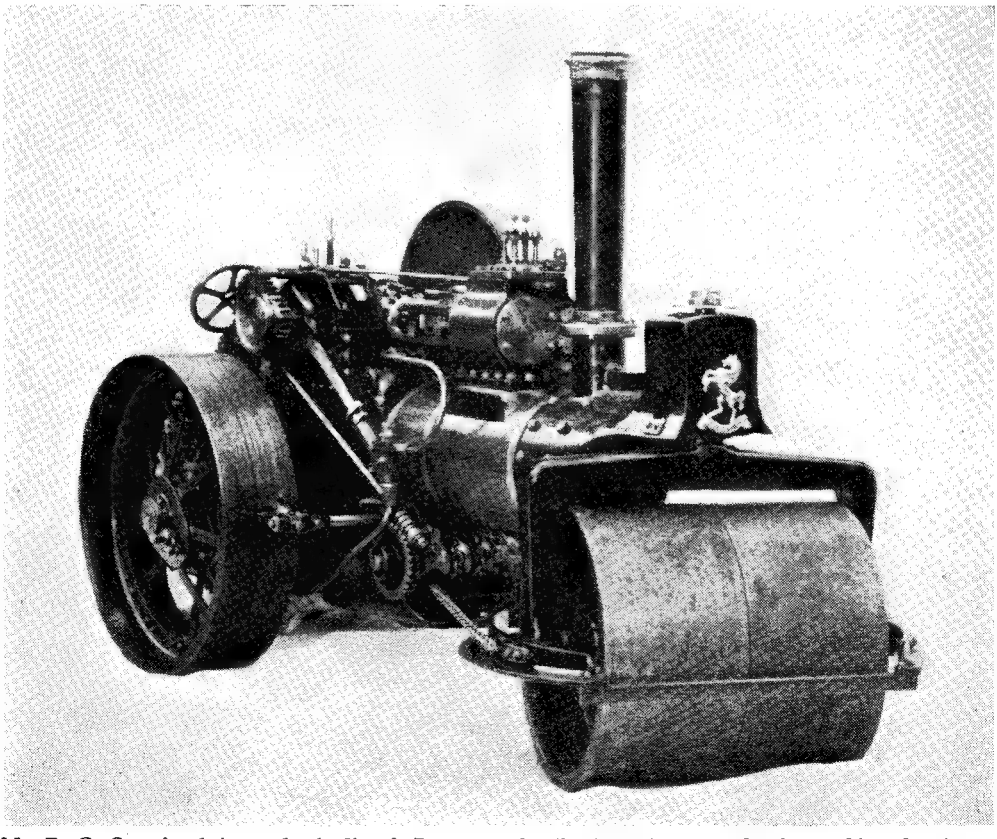
A contrast between two famous locomotive types is provided by Mr. F. Reynolds, of Newcastle-on-Tyne, who has sent in two 4-mm. scale Great Northern Railway locomotives ; one represents the ever-popular Stirling 8-ft. singlewheeler, and the other a large-boilered Ivatt Atlantic. Both are fully detailed and are excellent examples of careful craftsmanship in a very small scale.

We would like to call the attention of visitors to a 4-mm. scale G.W.R. " King " class engine built by Mr. E. H. Whittaker, chairman of the Manchester Model Railway Society. This astonishing little job, which is electrically operated by a motor situated in the tender driving the engine through a flexible shaft, reproduces all the external details of the prototype. The painting, and especially the lining have been done by an ingenious method which, for the present, we will leave for visitors to examine and try to decide how it was done. The effect is most realistic.



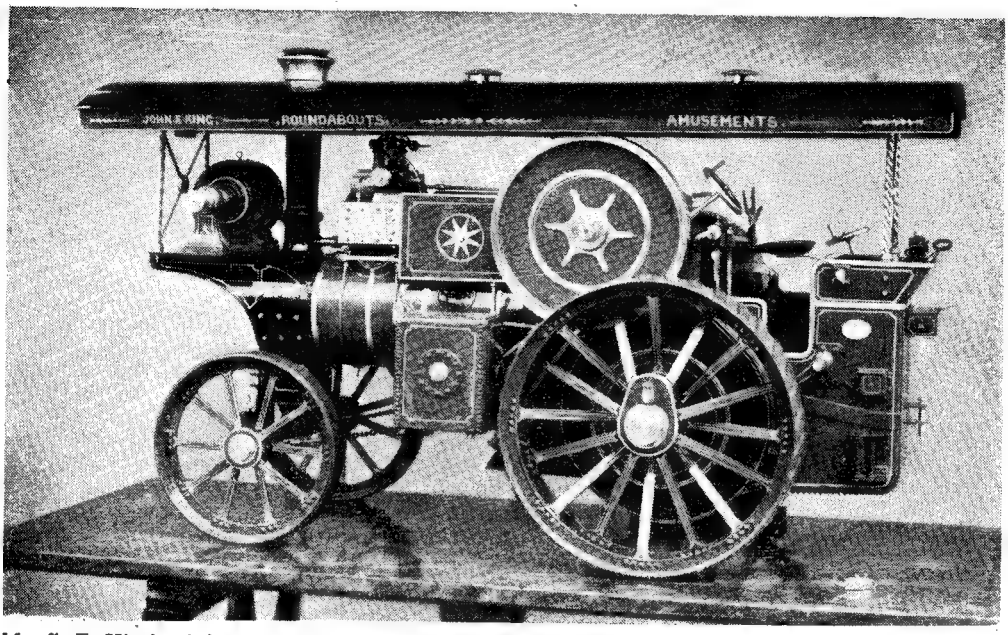
Mr. E. Lowe's 1¼-in. scale showman's engine

A very attractive piece of scenic modelling



Mr. R. G. Stone's 1¼-in. scale Aveling & Porter road roller is a nice example of something that is not very common

is to be seen in the 4-mm. scale railway station buildings and others made by Mr. P. B. Denny, of Ealing. They will repay close examination because of the many ingenious methods which have been used for the purpose of obtaining accurate and realistic effects. They have been made for use on the competitor's 4-mm. scale miniature railway, which is itself quite a masterpiece of reproduction of characteristic scenic detail, the standard of which is set by the accuracy of the locomotives, rolling-stock and general equipment.



Mr. J. E. King's 1½-in. scale replica of a Wallis & Steevens compound road locomotive adapted as showman's engine

Road Vehicles

A showman's compound road locomotive by Mr. E. Lowe, of Rotherham, is a splendid piece of work to the scale of 1½ in. to 1 ft.; it occupied two years in its construction and, moreover, is a "first attempt." That it is a really outstanding job is evident from the fact that it won first prize and the Championship cup at Sheffield in 1949; first prize at Rotherham in 1949; first prize at Chesterfield in 1950, and first prize and Championship cup at Grimsby in 1950. With such a record as this behind it, it is certain to attract much attention during the "M.E." Exhibition.

Mr. G. Wills, of London, E.10, rather breaks away from the usual in his 3-in. scale (¼ full size) model of his own 1936 Stevens motor-cycle combination. It is a sizeable model, being 2 ft. long, 18 in. wide and 12 in. high, and works in the same manner as the prototype.

Models of steamrollers are not very often seen, but Mr. R. G. Stone, of Eastham, has entered a 1½-in. scale reproduction of an Aveling & Porter 10-ton road roller, which is sure to prove of interest; it was built from drawings supplied by Aveling & Barford Ltd., Grantham.

A 1½-in. scale Wallis & Steevens compound road locomotive built by Mr. J. E. King, of Horndean, appears to be another outstanding piece of work in this particular class. Most of the main castings were supplied by Summerscales, of Cosham, but all the machining, boiler, fittings and the rest of the engine are by the builder. The information was obtained from a general arrangement drawing and brochure supplied by Wallis & Steevens Ltd., and the model certainly seems to be an exact-scale reduction of the very handsome prototype.

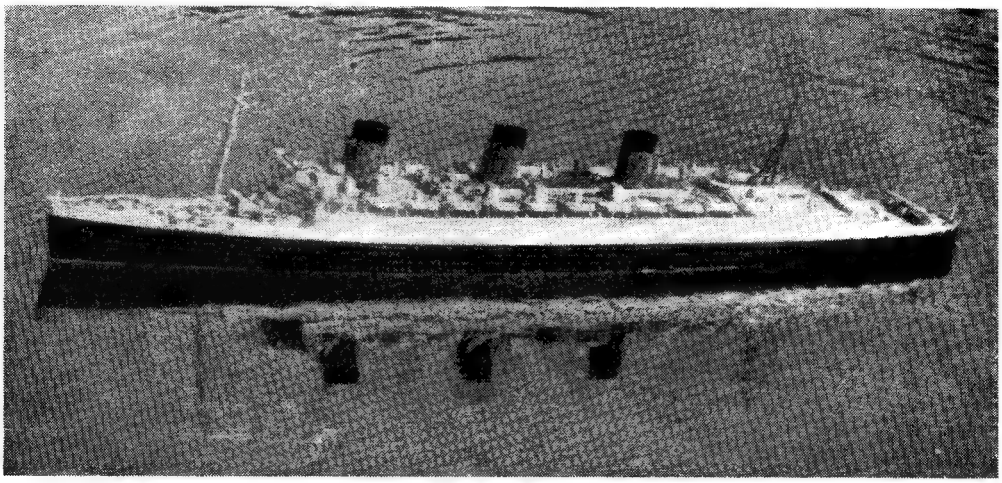
An interesting example of a Burrell engine is seen, this year, in a 1½-in. scale "Light Devonshire" single-crank compound, built by Mr. E. W. Balson, of Southampton. This engine evidently works well and is typically powerful, judging from reports we have had of it.

Two smaller traction engine models are both to ¾-in. scale, one by Mr. D. Sincock, of Redruth, and the other by Mr. T. Sellars, of Stonehouse; they show some good workmanship, and we understand that they are satisfactory in performance.

We hope to follow up this preliminary survey with some critical commentaries in future issues.

*Marine Models

COMING now to the working model steamers, class "E," we have two models of the Cunard Queens, namely, a model of the *Queen Mary* by G. H. Charlton, of Broadstairs, Kent, and a model of the *Queen Elizabeth* by Mr. Peter Cozens, of Blackheath, S.E.22. The *Queen Mary* is to the scale of 1/32 in. = 1 ft., giving a model of just over 31 in. long. At this scale, especially with its long slender hull, extra depth was essential to give stability. Above water the proportions are perfect as one may see from the photograph. The builder is to be congratulated on its fine appearance on the water.

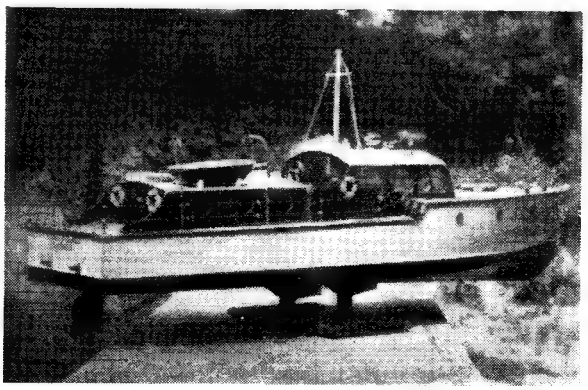


Mr. Charlton's working model of "Queen Mary," the famous Cunarder

The model *Queen Elizabeth* is also very fine looking, being nearly 6 ft. long. The builder is an actor and broadcaster, and his model was made at odd times and places all over the country. After suppressing the urge to build a ship model for a long time Mr. Cozens found himself touring in a farce with nothing to do in the middle act. As he says in his letter to us "This was too much. I had no sooner toyed with the idea of making a model than whoosh! I was off." The result is in our Exhibition today, and a very creditable effort it is. The model is radio-controlled and if her performance on the water is at all equal to her appearance she will be a worthy representation of her prototype.

*Continued from page 272, "M.E.," August 23, 1951.

Another notable model is the ⅛ in. scale model of the cross-channel steamer *Arnhem* by Mr. W. Brogan, hon. secretary of the Hastings and District Model Engineering Society. It is built of tin-plate on a wooden former on the system demonstrated by Mr. Chapman in our Exhibition last year. The decks are of thin plywood and the superstructure is of cardboard. In addition to being a working model it is fully fitted throughout. It contains 118 cabins, 181 chairs, 125 wash-basins and a host of internal details, and is a notable example of scale modelling. This is the builder's first attempt at ship modelling and should be an encouraging example to the model engineer of the interest to be found in ship modelling.



Mr. R. Kennard's model cabin cruiser built with one hand!

Mr. Raymond Kennard, of Luton, is exhibiting a nice model of a cabin cruiser. This has a hard chine hull and an

open cockpit amidships, and in spite of the fact that the builder has only one hand the workmanship is of a very high standard.

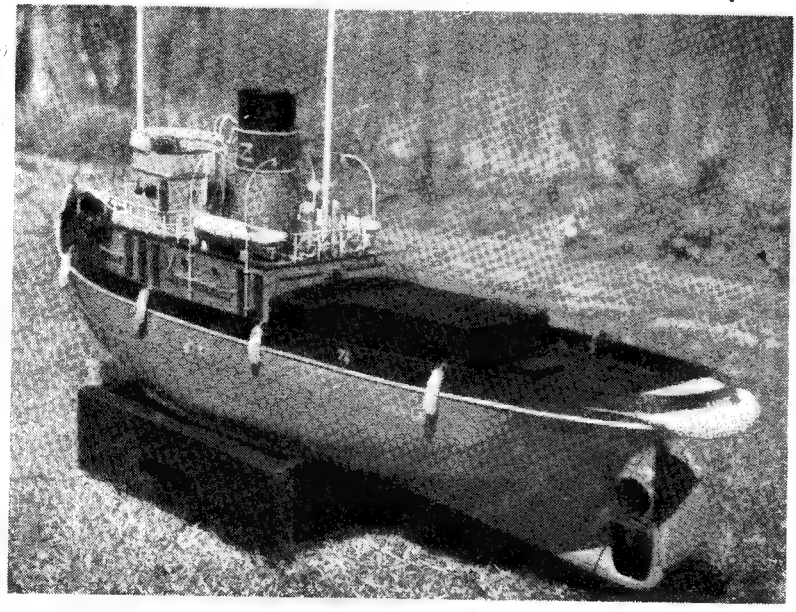
Another interesting model is that of the sea-going motor yacht by Mr. A. S. Abblett, of Ruislip, Middlesex, who won a bronze medal in last year's Exhibition with his Vosper motor yacht. This model is an exact copy of the prototype, which is the floating home of its owner. The hull is built on moulds and is correctly ribbed and planked, being held together by pegs and glue, not a single screw being used. A great deal of ingenuity has been shown in making the various fittings and furnishings from odds and ends.

Mr. M. Cutler, of the Sheffield Ship Model Society, has sent in his model cargo liner *Avon*. This is a very fine version of the "Penang" model, the building instructions for which were published in THE MODEL ENGINEER during 1947. A full description of this model with photographs is being published in the September issue of *Model Ships and Power Boats*. The power unit is a double-acting slide-valve engine made from the description of a similar engine by E. Feilden in THE MODEL ENGINEER for August 18th, 1949.

Another model based on an "M.E." design is that of the cabin cruiser *Gemini* by K. W. Chappell, of South Norwood, S.E.25. This is to the scale of 1 in. = 1 ft. and measures 48 in. long by 12 in. beam. The hull is of plywood with cabins of mahogany. The power unit is a twin-cylinder petrol engine of 30 c.c. capacity, the cylinder block and base being fabricated, the cylinders having wet steel liners pressed in. An Atomag minor magneto is fitted, as also is a Westbury design distributor and water-pump.

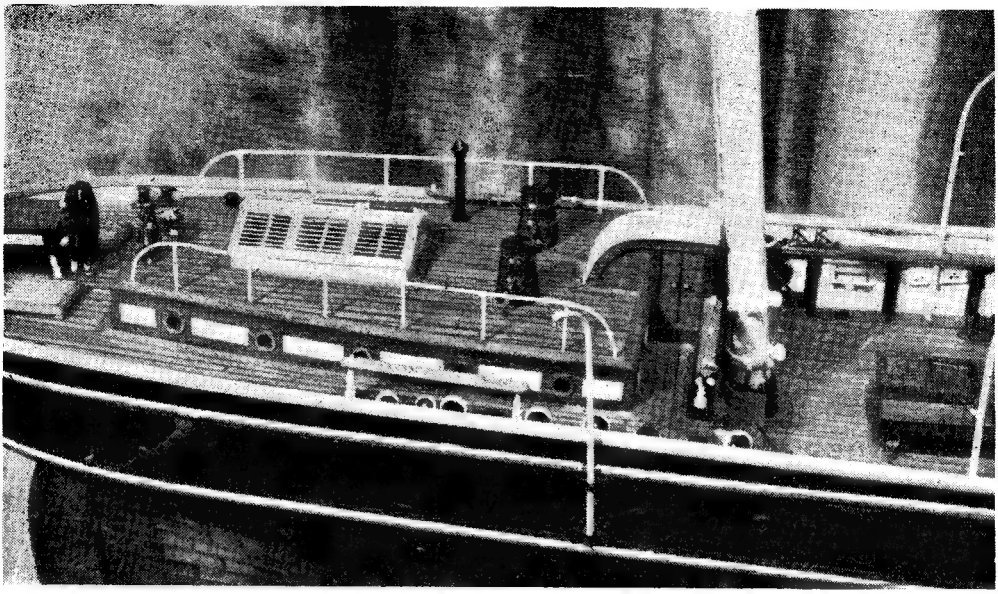
For a beginner's effort the model cross-channel steamer by F. W. Talbot, of Minet Gardens, S.W.9, does him great credit. The hull and superstructure are based on the articles in THE MODEL ENGINEER by Mr. J. E. Jane, on his model of *Brittany*. The engine is the Westbury design *Trojan* and has been fabricated, as castings were not available at the time. This is the builder's first attempt at model engineering, but considering that he had to make his own lathe and drill before commencing his model it is highly creditable. We expect to see more and better ship models from his workshop.

An excellent model of the Adleburgh No. 1 lifeboat is entered by Mr. C. W. Morley, of Warwick Square, S.W.1. This is an electrically-driven radio-controlled model and was made from drawings supplied by the Royal National Life-boat Institution. The scale is 1 in. = 1 ft., giving a length of 41 in. and a displacement of about 30 lb. The lifeboat is an excellent prototype for a working model, and the easy lines and nice proportions of the original have in this case been faithfully reproduced.



A handsome tug model by Mr. R. C. Jackson

Another fascinating prototype is the modern steam trawler. An excellent example has been submitted by Mr. A. V. Gregory, of Scunthorpe, Lincs, the scale being $\frac{3}{8}$ in. = 1 ft., giving a model 6 ft. long. Unfortunately this model has no engine at present. The model steam yacht *Philante* by Mr. J. V. Chandler, of Leigh-on-Sea, Essex, is sure to attract attention, especially as the original was recently seen in London under her present name, *Norge*, when the King of Norway visited the city. This is to the scale of 4 mm. = 1 ft., giving an overall length of 41 in. with 6 in. beam. The model was made from a Skinley design.



A close-up of Mr. Field's "Cutty Sark" before being rigged

Scarcely an Exhibition is held without a version of the ever-popular *Gondia* steam tug. This year's example, *Annie*, is an excellent model by Mr. R. C. Jackson, of London, N.22. The hull and superstructure are built of wood and the care bestowed on reproducing the lines of the hull and the details of the superstructure has resulted in a very handsome model.

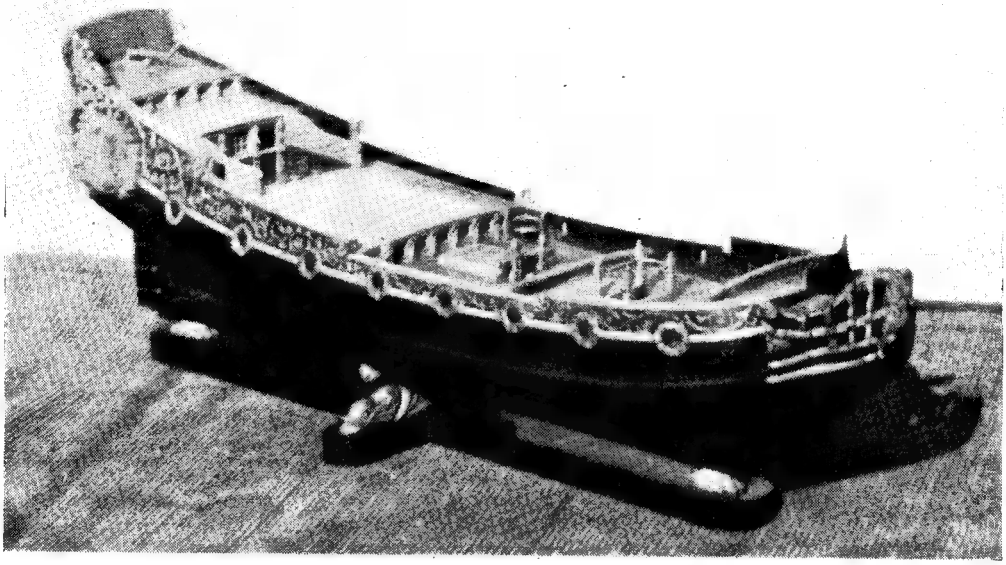
Sailing Ships of Any Period (Non-working). Class "F"

One of the most notable exhibits in the sailing ship (non-working) section is the *Cutty Sark* by Mr. A. E. Field, of Walsall, who won the championship in this section in the 1949 Exhibition. This is one of the most completely detailed models of this ship we have ever seen, and Mr. Field is to be congratulated on a magnificent effort. Our photograph, which was taken before the model was rigged, gives a good idea of the amount of detail included in the hull. The model is based on Dr. Longridge's book, Lubbock's *Log of the "Cutty Sark,"* and frequent visits to the actual vessel. The hull was commenced some years before the war and has been somewhat of a stand-by job with Mr. Field for many years. All the ropes used in the rigging were specially laid, on a machine made by Mr. Field, and are to scale size.

Another model of a very similar quality is that of H.M. Paddle Frigate *Vulture*, 1846. This is made by Rear-Admiral Blackman, of Bishops Waltham, Hampshire, who will be remembered for his H.M.S. *Prince* of 1670, which won a silver medal in last year's Exhibition. The model is to the scale of $\frac{1}{8}$ in. = 1 ft., and is notable for its beautiful workmanship and accurate detail. It is one of a series Admiral Blackman is making to illustrate the development of the rigging of ships during the centuries. The first was an Elizabethan ship which won a medal in our Exhibition before the war, the next was the *Prince*. There will probably be one illustrating

The one-gun gunboat by Mr. H. A. Kirby

the rigging of the Nelson period, and this present model represents the final stage before sail gave way to steam. In fact, the model might have been classed as a steam ship but we prefer to think of it as a sailing ship with a steam engine as an experimental auxiliary. Its design involved an immense amount of painstaking research. Very few records seem to have been kept of the ships of this period, probably because, being experimental, they were looked upon at the time as being of only temporary interest and thus were not fully documented. The prototype of this model was designed by Sir William Symons for experimental purposes.



Mr. Comber's model of a Stuart royal yacht

Another model which will no doubt attract a good deal of attention is that of the one-gun gun-boat of 1788, by Mr. H. A. Kirby, of Mitcham, Surrey. Mr. Kirby can always be depended upon for something interesting in the way of ship models. As our illustration shows, this is a very nice piece of work, well finished, and full of interesting detail. With its lateen sail and jib it has a somewhat foreign look, but with its large crew and powerful gun its prototype had been a powerful weapon of war. This model is a useful example of the scope there is for the ship modeller who wishes to get out of the rut, and also of the interest that may be found in making a model of a small ship. The plans were photostats of Admiralty draughts which were obtained from The National Maritime Museum.

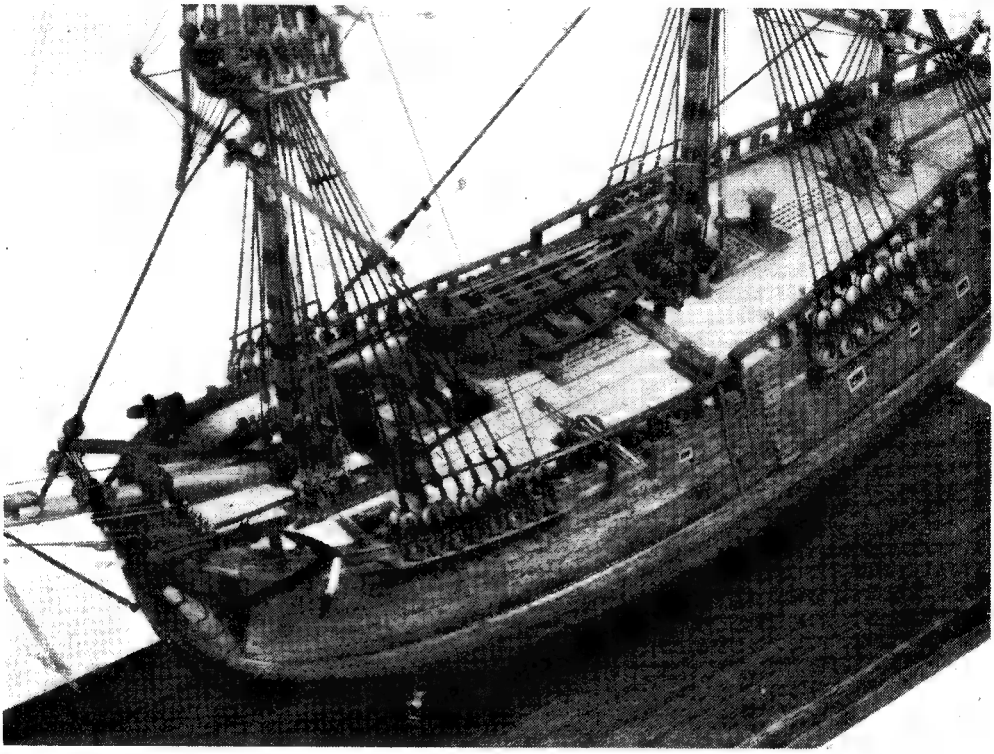
The model of the Stuart Royal Yacht by William Comber, a van driver, of Birchington, Kent, is another example of the interest to be found in modelling a small ship. This is a lovely model built of mahogany and boxwood from a draught obtained from The Science Museum. The hull is ribbed and planked, the planks being of $\frac{1}{16}$ in. fastened with upward of 1,500 treenails. The decks are planked with cedar. The decorative work was made from boxwood offcuts, the work being done with a penknife and fretsaw. As the builder was unable to get to the Museum, the decoration was to some extent improvised, but the general style of the work is quite in keeping, and the sumptuous character of the hull is very well exemplified. The model is not painted, but the effect of the boxwood on the darker mahogany is quite pleasing, as will be seen from the photograph we reproduce herewith. Mr. Comber hopes to rig his model after the Exhibition. Other models made by Mr. Comber, but which are not exhibited, are a Tudor ship, an Elizabethan galleon, an *Endeavour Bark*, a 12-gun brig and a topsail schooner, *circa* 1800, all of which are rigged and all of which are of a remarkably high standard.

The Elizabethan galleon by Mr. F. Cross, of Highbury, N.5, is a very nice piece of work. This was made from plans by Morgan Laird, of Great Russell Street, assisted by references to the Science Museum draught, and the books by Craine and Battson published by Percival Marshall & Company. This is a very nice model and the rigging is particularly neat, due largely, no doubt, to the fact that the builder has served in the Royal Navy. An interesting feature is the crew which is shown at work in various parts of the ship. The builder made his first to help him keep the deck fittings, doorways, etc., to scale size. He found this work so interesting that he made several more men to show them at work about the ship. The figures made of Perspex and were bent into various

suitable attitudes by means of the application of heat.

Speaking of Perspex, a rather interesting model is that of the *Bounty* by R. W. Ray, of Chesterfield, which is built entirely of Perspex, even to the masts and spars. Moreover, it is rigged with nylon to preserve the transparent effect. The base in black and white forms a nice contrast.

The model of the *Endeavour Bark* by Fl.-Lt. unfortunate in being based on a rather unsatisfactory design. In this design the hull has the sheer which was the characteristic of the late 18th century ships, whereas the rigging is late 17th century : also the stern gallery and quarter galleries bear little or no resemblance to these fittings in any period. Perhaps Mr. Buchel is a lone worker, and would have been steered clear of this difficulty had he been in touch with other experienced ship modellers.



A close-up of Fl.-Lieut. Ferry's " Endeavour Bark," showing the clean deck details

E. T. Ferry, D.F.C., is a very fine example of ship modelling. It was built to designs by H. A. Underhill and is well worth careful study. The hull is planked, and the deck fittings and rigging are worked out in great detail, as will be seen from the photograph reproduced herewith. The whole model gives one an impression of rightness and "shippiness" which is very pleasing. This model ranks high among the many models we have seen of this ship and the fact that the builder has made such a fine model in spite of having to move about the country so often says much for his keenness and perseverance.

We have two models by Mr. P. Buchel, a choreographer of Chelsea, S.W.3. The one of the *Cutty Sark* which is actually a miniature, being built to the scale of 25 ft. = 1 in., is a very pleasing model. The other model, however, which is of the *Royal Albert, circa* 1700, while being a very nice piece of craftsmanship, is

A Thames barge is always a popular subject with model makers and this year we have a very fine example of this type in the model by E. C. Freeston, of Greenford, West Essex. This is to the scale of $\frac{1}{4}$ in. = 1 ft. and was made from the drawings of the barge *Kathleen* by Mr. E. J. March whose book on the subject of spritsail barges is well known and deservedly popular. The model is depicted as laying on sand and shingle berth but with all the sails set, the fore hatch is open showing the construction, whilst the main hatch is battened down, with sweeps, boat hook, etc., on the tarpaulin cover. The hull is carved from the solid and the deck is laid in separate planks, the caulking being represented by passe partout paper between the planks. The standing rig is made of 40-gauge phosphor-bronze wire twisted up according to the thickness required. The rigging throughout is very complete and the sails can be furled or brailed up by the appropriate ropes. As our

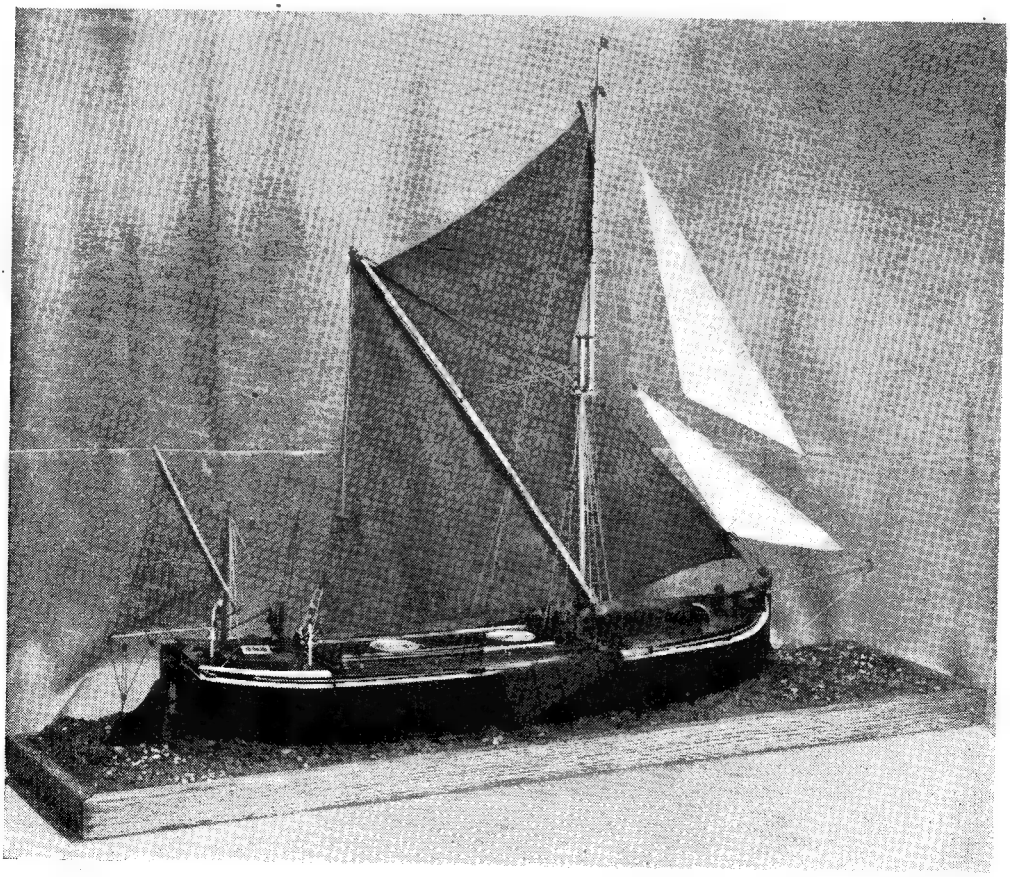
photograph shows, this is a very fine model and will be much admired.

There are at least three models of the *Archibald Russell* in this year's Exhibition, made from particulars given in the book published by Percival Marshall, one being by L. W. Herries, of Lower Willingdon, Essex. This is a waterline model with the ship represented as sailing in a whole sail breeze. Another is by T. R. Martin, of Peckham, S.E.15, and is to the scale of 3/32 in. = 1 ft. This is the builder's first attempt at modelling a sailing ship and the result is very creditable. The third model is by Herbert G. Harrison, of New Southgate, N.11, to the scale of $\frac{1}{16}$ in. = 1 ft., as shown in the book. This also is the builder's first attempt at ship modelling.

Mr. F. A. A. Pariser, of Birmingham, whose model of H.M.S. *Victory*, which was in last year's Exhibition, and is now in the "Victory" Museum at Portsmouth, is represented this year by a model of the 18-gun brig of war, *Procrius*, of 1806. This is to the scale of $\frac{1}{4}$ in. = 1 ft. and was built from an Admiralty draught obtained from the National Maritime Museum, the rigging being based on Steel's well-known book. The hull is framed and planked, part of the frames being left exposed. This is a very fine model and the whole of the work is carried out to a uniformly high standard. The hull is left unpainted, which is rather a severe test for any built ship-model.

Another notable model is that of the wood brigantine *Raven*, of 1875, by C. J. Clarke, of the Birmingham Ship Model Society. This is built to A. H. Underhill's plans and has a solid hull, the bulwarks being planked on stanchions. These two entries, together with the *Cutty Sark* by Mr. Field, already mentioned, are the Club Team Entry for the Birmingham Ship Model Society and are considered a formidable trio. There is keen competition for the Club Team Cup this year, both between the ship model societies and the other clubs, and it will be very interesting to see the result.

Probably the oldest competitor this year is Mr. Stocqueler, of Cardiff, who is 84½ years of age. He tells us that he fell in love with ships through seeing them in the Bristol docks when he was attending the old Bristol Grammar School on College Green. As his father was born in India, and his family have been connected with India for many years, he was naturally interested in the East Indiamen when



A fine spritsail barge model shown aground by Mr. E. C. Freeston

on his retirement, he turned his attention to ship modelling. His latest model is of the East Indiaman *Brittany*, of 1806, built to the scale of approximately $\frac{1}{16}$ in. = 1 ft. The hull lines and details were taken from some pre-war copies of *Marine Models*, but as he has been unable to get particulars of the rigging he had to do what he could with the material available. Apart from one or two slight errors in the rigging, this is a very nice model and a very creditable effort for a lad of Mr. Stocqueler's age.

Mr. J. W. B. Soddy, of Luton, Beds, has entered two models, one of a 16th century Genoese carrack and one of a Flemish carrack. The former is built to the scale of 6 ft. = 1 in., and the Flemish carrack to the scale of 10 ft. = 1 in. The Flemish carrack was made to the plans and directions in *Model Ships and Power Boats*. Both models are notable from the quality of their woodwork as well as for their accuracy and general high standard.

The model sailing dinghy by C. T. Seller, of Ruislip, is a very good example of accuracy in a model. Not only has the design and construction been followed very closely, but the materials used are similar to those of the prototype. The skin is built in two plys of mahogany and veneer, and steamed ribs are fitted in afterwards. Some of the equipment of the prototype is reproduced in the model.

Last, but not least in the sailing ship section, we have the model of a raft, used on the Kon-Tiki Expedition. This is built by a lady competitor, Miss D. Kimber, a nurse, of Hayes, Middlesex. This model was built from the particulars and description given in the book, with some guidance from the plans by *Model-craft*. Being a nurse, her time is very restricted and the opportunities for model making are rather limited. In spite of this Miss Kimber has made a very nice model and we congratulate her heartily on her work, and hope it may encourage other ladies to enter the ship modelling field.

In the section for working model yachts and ships, we have five Marblehead yachts, three of them being entered by Mr. D. A. MacDonald, of London, S.W.12. These three are each of a different type. The first one is built to a design by Mr. W. H. Jones and shares with another boat the London League Championship for 1951. She also holds the Clapham Model Yacht Club Championship Cup and other trophies. This yacht is fitted with Braine steering gear. The second of Mr. MacDonald's entries is *Jemima Duck*, and is of the design introduced by Mr. H. B. Tucker just before the war. This has the full lines at the bow associated with Mr. Tucker's *Donald Duck* type. It is fitted with a combined Braine and vane gear. It has been very successful in racing and in the Marblehead National Championship held at Dovercourt this year, she finished sixth. The third model by Mr. MacDonald is of the sharpie type and is built to his own design. This is fitted with vane steering gear. It will be interesting to learn how she compares with her stable companions.

The "M" class model yacht by M. J. Richards, of Kensington, S.W.10, is built to a design by A. W. Littlejohn. Much of the work was done at the Kensington Men's Institute, as the builder

Mr. Maycock's 36 in. R yacht built from a Mullet kit

has insufficient space at home to build a boat of this size. The "M" class yacht by Mr. A. S. Parker, of Hanwell, W.7, is to Mr. Littlejohn's "Kittiwake" design. It is of laminated construction being built over a former with the outer planks laid diagonally. The hull finished weighed 2¼ lb. No screws were used in its construction.

An interesting model is that made by Mr. G. W. Sinclair, of Exeter. This is a ½-in. scale model of a "J" class yacht of 1900. She is fitted out in every respect as the original, with cabins and furniture. The steering gear is by wheel and screw as on the original, but Braine gear can be used for racing. Its speed is equal to that of the average 10-rater, the overall length being 57 in. and the beam 12½ in.

The 36 in. restricted class yacht by Mr. C. B. Maycock, of High Barnet, was made from a kit supplied by Mr. A. Mullett, of Brighton. Certain refinements, as suggested in Daniel's and Tucker's book, *Build Yourself a Model Yacht*, have been incorporated. This is a very fine model, well finished throughout, and shows how a high-class model can be built from a kit provided the kit is based on a good design and the materials in it are of good quality, as is the case in this particular instance.

Another interesting model is that of the Grimsby fishing smack of 55 years ago, made by S. V. Gregory, of Scunthorpe, Lincs. This is a model of his father's vessel and Mr. Gregory has adapted it for sailing.

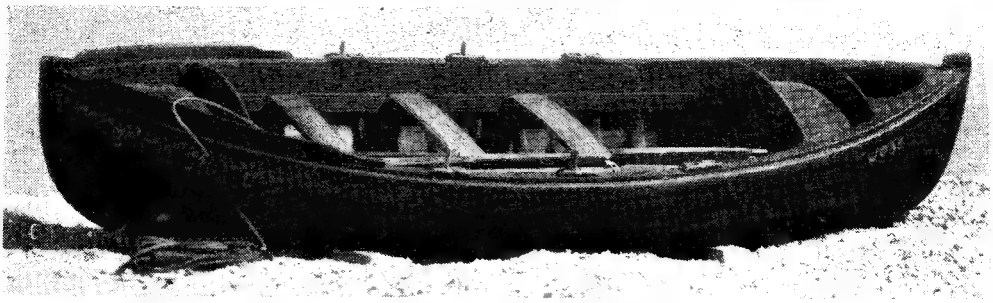
Mr. C. L. Robinson, of Mexborough, Yorks, who is a student of 19 years of age, has sent a sailing model of the U.S. privateer sloop *Rattlesnake*. This is built to scale from drawings in Chappel's book, *The History of American Sailing Ships*, and sails satisfactorily without any external ballast. The ballast consists of 3 lb. of lead fixed to the floor of the ship, and the dimensions are 36½ in. overall, 26½ in. figurehead to taffrail, 5¾ in. beam, 3 in. draft. Mr. Robinson is an expert in the sailing of square-rigged models, and his excellent model of the clipper *Caliph*, which was exhibited last year, will be remembered.

Another fine sailing ship model, also built by an expert in sailing square riggers, is that of the *Star of the South*, a four-mast barque by Mr. Kenneth Williams, of Hove, Sussex. Mr. Williams had already built a four-mast barque which he has sailed for many years, and this new model is the result of his experience. Many interesting features have been embodied both in the fittings and in the rigging, and the result is a model which is both realistic and efficient in sailing. We saw it sailing in a recent regatta and were greatly impressed with its handsome appearance when sailing, and with its speed.

A model which we have found rather difficult to classify is that of the *Bolinche* type fishing boat which has been sent to us from Barcelona, Spain, by Senor Jaime Puig-agut. In a letter the builder says: "It is of the type known as the *Bolinche*, since it is employed in fishing for bolinche, and is constructed with a view to lightness in order that it may be handled at sea and launched by one man. Consequently, it is one of the smallest fishing boats constructed in the province of Andalusia and because of its adaptability may be found in all seaports of Spain." The model, which is planked on sawn frames and floors, is a beautiful example of craftsmanship, and is obviously the work of an expert in these matters. Our photograph gives some idea of its graceful appearance.

The miniature section this year does not seem to be quite as large as in previous years, but it nevertheless contains some outstanding models, perhaps the most notable model being that of H.M.S. *Prince*, of 1670, and a 12-gun brig-of-war sent by Mr. Donald McNarry, of Barton-on-Sea, Hants. We have ceased to wonder at Mr. McNarry's work, having become somewhat used to its minuteness of detail, combined with perfect workmanship. Every year he produces one or two masterpieces. We wonder if his success is due to some extent at least from the enthusiastic support he gets from his wife, who is herself an expert miniaturist: in fact, Mrs. McNarry's model last year earned two high awards against her husband's one. Mrs. McNarry is not exhibiting this year, but her husband's two exhibits are, as usual, marvels of craftsmanship. They are to his usual scale of 50 ft. = 1 in. and being both of small ships they must be studied at close quarters before the intricate details which they embody can be realised. The *Prince* is shown without rigging. The hull, which is 4¼ in. long overall, is built throughout from the keel upward. As a considerable amount of the planking and decking have been left off, the frames and floors are exposed and thus have had to be made in full detail, Navy Board fashion, of course. Photographs of the hull at various stages in its construction are exhibited with the model. The brig is shown completely rigged with its suit of sails, and is a perfect little gem, its overall length being only 3½ in. The hull is carved from a piece of holly, the decks laid, the bulwarks and upper part of the external hull being planked to scale with planks of holly, of widths varying from 1/50 in.-1/100 in. The underwater hull is coppered with over 700 plates, each approximately 4/50 × 1/50 in. Guns and carronades are shown on the decks with all the remaining fittings including a steering wheel with tackles to the tiller. One of the cabin doors is shown open and on the inside hangs the commander's coat and sword. The masts and spars are made of boxwood, the sails of paper, and the rigging of copper wire and single, double, and triple strand silks.

Lt. A. G. S. Arnot, R.N., is exhibiting two models, one of H.M.S. *Gabbard*, a battle class destroyer, and the other of the Royal Stuart Yacht *Katherine*, of 1674. The latter was built from drawings in John Lewis's book *The Ship Modeller's Logbook*, published by Percival Marshall & Company last year. This is a very attractive model of a very interesting type of ship. The prototype was one of the first yachts to be built in England and was built by Phineas Pett at Woolwich. It is highly probable that Pepys sailed in her. The scale is approximately 28 ft. = 1 in. The model of H.M.S. *Gabberd* is a very nice piece of work, with a wealth of accurate detail which has been verified by knowledge of the actual ships. Practically the whole of the work was done in the builder's cabin, and



A Bolinche type fishing boat model by Senor Jaime Puig-agut, of Barcelona, Spain

when at sea he tells us there has to be a veritable routine of securing everything, the vice being his most useful tool.

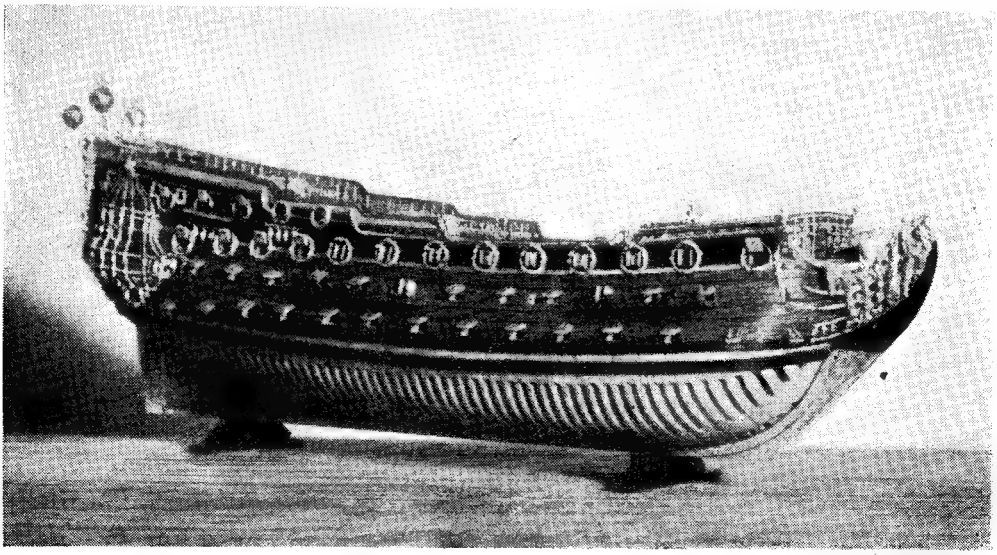
Another interesting miniature is that of M.V. *Wanstead*, a modern cargo liner, by W. R. Finch, of Potters Bar. This was made from drawings in the *Shipbuilding and Shipping Record*. Drawings and a description of this ship were also published in *Model Ships and Power Boats* for December, 1950. This is a very fine example of the high grade modelling we usually associate with Mr. Finch whose waterline models may be seen in some of the London museums.

The model of M.V. *Bruno*, a typical modern Norwegian ship by Mr. R. Carpenter, of Brighton, is an excellent example of miniature work. Mr. Carpenter has produced many beautiful models and this is a notable addition to his series.

As an example of a ship in a bottle we have the 18-gun ship of 1719 in an 180-watt electric light bulb by Thomas Royston, a merchant seaman on R.M.M.V. *Athlone Castle*, whose home is at Ringwood, Hants. The work was carried out in the builder's bunk in a cabin which he shares with three other seamen. The ship is set on a plastic sea in an upright position in the bulb and is to the scale of 1 in. = 100 ft.

The smallest scale ship model in the Exhibition is undoubtedly that of the clipper ship by C. V. Thompson, of the Hammersmith Ship Model Society, who is well known to ship modellers for his sailing models of galleons. This is a new venture for him and is one of the smallest full-rigged ships we have seen. Being to the scale of 200 ft. = 1 in. giving a length of less than 1½ in. Moreover, it sails! Actually, it is an attempt to make the smallest three-master in the world, capable of sailing. Unfortunately, so the builder says, it needs a false keel for sailing, but she sails with the wind on her beam or aft, the yards being swung to suit, but needs a drogue when running.

We have another model by a woman ship modeller, this being of a Syrian schooner by Mrs. Val Montagu Fergusson, of Gerrards Cross, Bucks. The prototypes are schooners of about 200 tons displacement which trade in the Eastern Mediterranean. The model, which



Mr. McNarry's lovely miniature of H.M.S. "Prince" (1670)

is to the scale of 1 in. = 10 ft., was made from photographs taken by her in 1943. Mrs. Montagu Fergusson has done a good deal of sailing in the Mediterranean and has an intimate knowledge of the local craft. This is reflected in her model which shows the lively sea sense which is present in all her models, some of which we have already seen in our Exhibitions.

The last, but by no means the least, important of the models we have described, is that of a model fishing boat by Mr. G. H. Draper, of Ilford, Essex. This is a new departure for Mr. Draper who is well known for his models of liners at 100 ft. = 1 in. scale. In this case the object of the design, which was made by the builder of the model, was to provide a boat for three anglers for pond or river for bottom fishing, or two anglers using the fly or spinning. The model, which is to the scale of $\frac{1}{2}$ in. = 1 ft. is $7\frac{1}{2}$ in. long by 2 in. beam and is built in the same manner as the full-sized boat would be. The various items of fishing tackle are shown, being replicas of those owned and used by Mr. Draper. To add to the interest the boat is shown in a miniature setting with a boathouse as a background, and is well worthy of the closest study.

In conclusion we are certain to have omitted to mention some very interesting models, but we can only offer our apologies to any competitor who may feel slighted. Something is sure to be overlooked in such a collection of fine models.

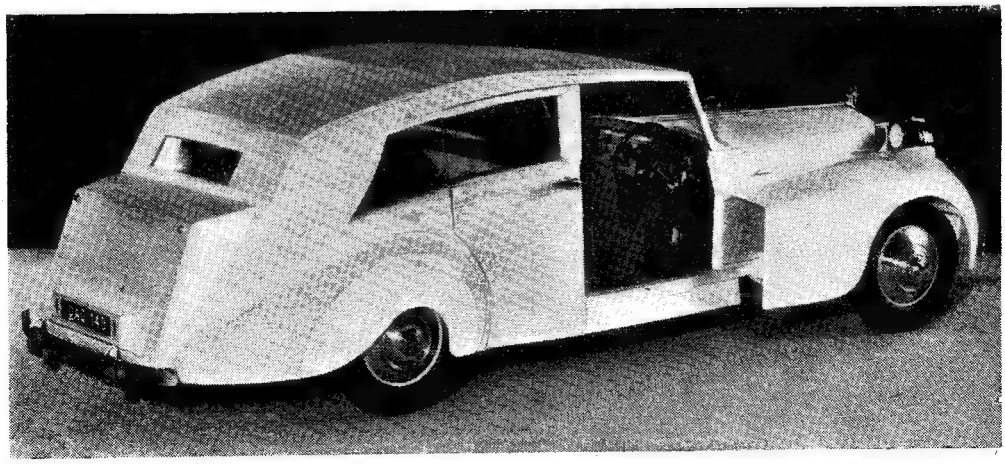
Model Cars

ENTHUSIASTS who read these notes will undoubtedly be disappointed to observe the meagre list of entries in this section. We can only hope to compensate the lack of quantity by further observation, which seems to point to a general improvement in quality; and this, after all, is the essence of good modelling.

Our illustration shows the very creditable Rolls Royce touring limousine constructed, *a la kitchen table*, by Messrs. Dagnall and Hamilton. The coachwork is of balsa, with metal fittings chromium plated, and the interior is upholstered in leather at the front and fabric at the rear, with arm rests, folding occasional seats and ash trays all fitting into the scheme.

Mr. L. A. Hancox's neat TC-type M.G. Midget will be remembered by most readers as having appeared on a recent cover of THE MODEL ENGINEER, together with an article describing its construction. It is truly a unique model, incorporating all the scale essentials which bring out the authentic atmosphere of the prototype. Particularly noteworthy is the splendid finish which Mr. Hancox has achieved in wood, the only metalwork in the major assembly of the coachwork being the wings, which were beaten from brass sheet. Power is supplied by a Mills Mk. I 1.3 c.c. engine driving through a home-made centrifugal clutch and bevel gears. The hood works in the approved manner, and the aerial has been craftily designed to act as the fuel knock-off switch.

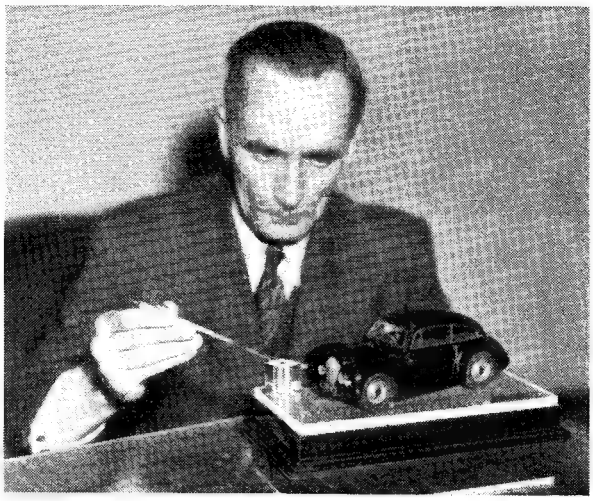
A 1/10th scale B.A.W. Special, the work of Mr. H. A. Williams, of Mitcham, shows what can be accomplished by an enthusiast who has neither owned, driven nor tinkered with a real car. The model is made in brass, finished in blue and silver, and represents, in chassis form,



Messrs. Dagnall and Hamilton's Rolls Royce touring limousine

a 1½-litre sprint-car, complete with suspension, engine, etc. The only bought parts are the Dunlop tyres.

From Grimsby comes Mr. R. H. Shillito's semi-scale special, which, in some ways, reminds us of the Jaguar XK120, although the design was conceived before the advent of the Jaguar. It is made entirely from scrap material and balsa wood, of course, with the exception of the engine, wheels and tyres, which were commercially produced.



Mr. Herbert Jackson with his 1/20th scale Healey saloon

A pretty little non-working model, Mr. Herbert Jackson's 1/20th scale Healey saloon, is a very good example of a mantlepiece miniature with all the trimmings. It is made entirely from scrap material joined with marine glue and french polished, great care being taken to preserve a strictly scale result, the body being of laminated mahogany, and hand-carved, which can be seen in the accompanying illustration.

Mr. R. J. Wallace, of Cowes, I.O.W., has chosen the Jeep as his subject, and the result is a most interesting 1 in. = 1 ft., non-functional scale model. It was built in the Far East when its constructor was serving in the R.A.F., most of the work being done out-of-doors in the tropical heat with tools which had to be made before operations could commence! In spite of the material being mostly scrap from Japanese fighter aircraft, a very creditable result has been achieved. The steering actually works, and the springs, shock absorbers, windscreen and wipers and other equipment all add to the atmosphere of this attractive effort.

Back to the functional models for a moment, and a word or two about Mr. P. Bennett's 1½-litre 6 c.c. Maserati. The body is formed from sheet aluminium beaten over a wooden former block and riveted. The radiator is fabricated, embodying wire gauze and fuse wire for a grille, and the chassis is of aluminium plate with leaf springs fitted to both axles.

Mr. Bennett is a sea-going marine engineer and the model was constructed at sea in a ship's engine room.

And lastly (though not intentionally so!), we come to another non-working scale model—the B.R.M. Made by Mr. Graham Darling, a university student, to 1/32 scale, this model should be of considerable interest to those of our readers who have contributed to the B.R.M. scheme and have so far been thwarted of the opportunity of seeing the real thing!

The Grand Regatta

The 1951 Model Power Boat Association Grand Regatta will be held at Victoria Park, Hackney, London, E., on Sunday, September 2nd, commencing at 10.30 a.m.

Events will be held in the following order :—

(1) 75-yd. Nomination Race.
(2) 500-yd. Race for E.D. Trophy. ("C" Restricted).
(3) 500-yd. Race for Mears Trophy. ("B" Class.)
(4) Steering Contest for M.P.B.A. Steering Trophy.
(5) 500-yd. Race for Victory Cup. ("C" Class.)
(6) 500-yd. Race for Speed Championship Cup. ("A" Class.)
(7) The Crebbin Trophy for fastest flash steamer.
(8) Prototype competition for the "M.E." Cup.

For this regatta all affiliated members of the M.P.B.A. are eligible, but the following conditions will apply.

All entries must be made in advance. Entries will be accepted by post, telephone, or may be handed in at the M.P.B.A. stand at the "M.E." Exhibition but *no entries will be accepted on the day.*

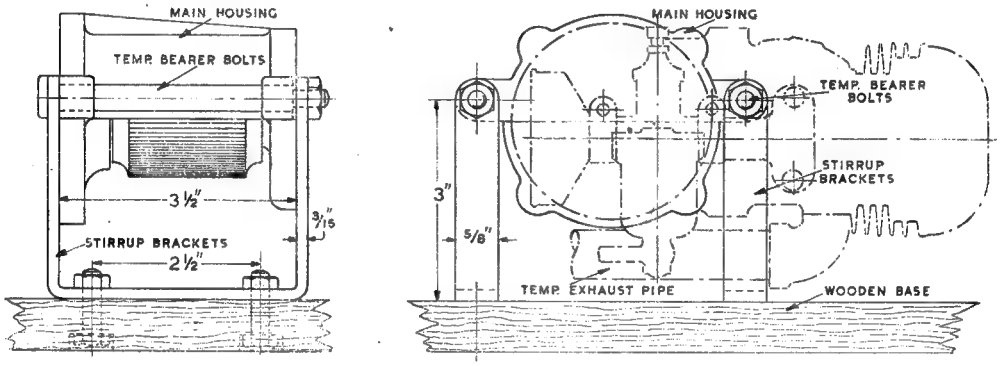
Competitors entering free-running boats should state the time for nomination race; name of the boat and M.P.B.A. number should be stated in all cases. In addition, only one boat per event may be entered by each competitor. In the speed events a special time limit will apply. Hon. Secretary: J. H. BENSON, 25, St. Johns Road, Sidcup, Kent. Tel.: Foots Cray 7428.

PETROL ENGINE TOPICS

*A 50-c.c. Auxiliary Engine

by Edgar T. Westbury

WHEN the engine is completely assembled, and the carburettor and magneto fitted, it should be carefully run in by means of an electric motor or other source of power, before any attempt is made to run it under its own power. For this purpose, it is advisable to build a temporary mounting, which may consist of a flat board with two U-shaped metal stirrups bolted to it, having ⅜ in. diameter holes in their upper extremities, to take cross-bolts which pass through the eyes of the main housing of the engine.



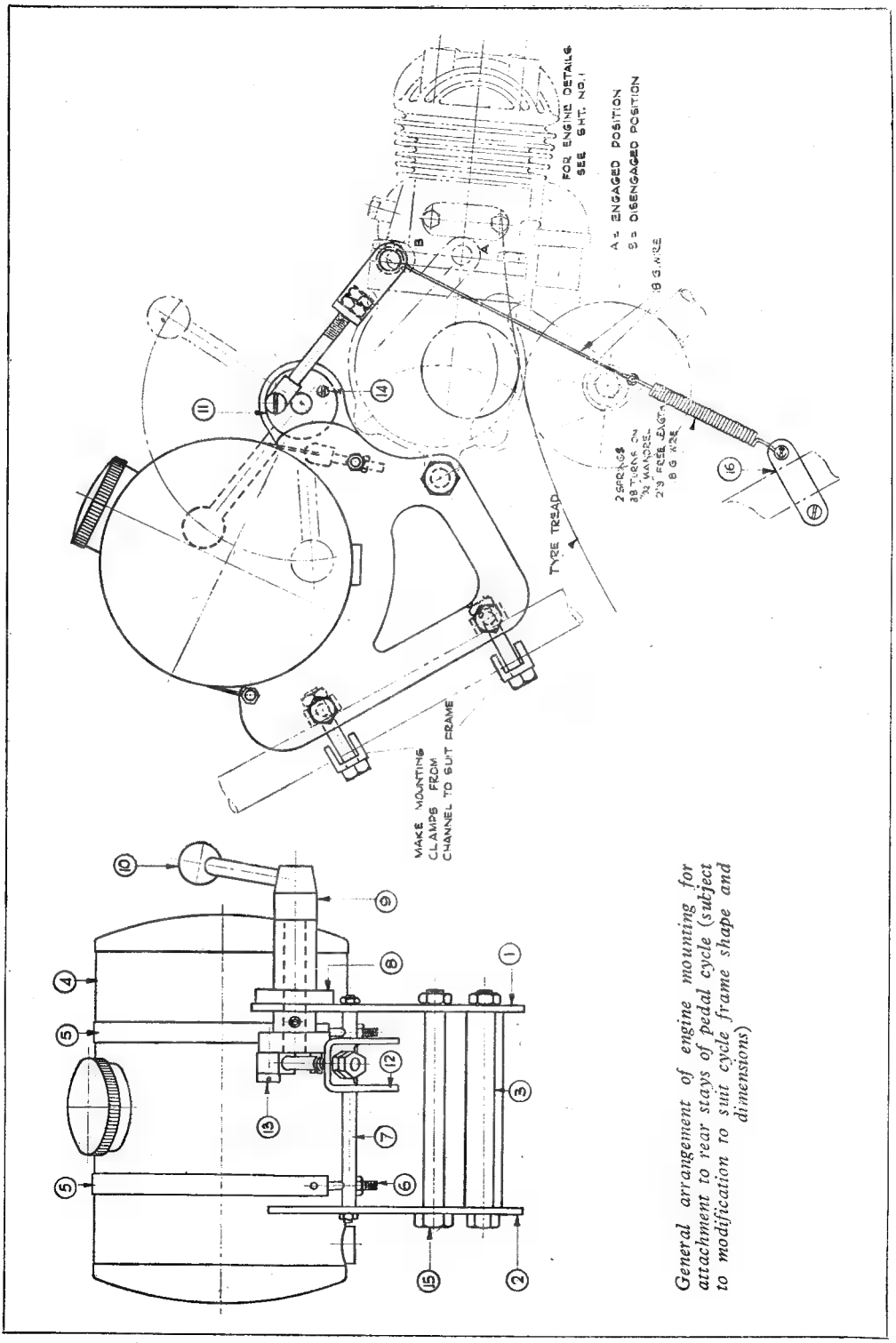
Temporary mounting for running-in and testing engine

As this mounting may well serve as a test bench, after the initial running-in period, it may be equipped with a fuel tank, mounted a few inches higher than the engine. The baseboard should be long enough to enable it to be screwed or clamped down to the bench or other solid foundation.

The question now arises of providing some means of turning the engine for running-in or starting. It is possible to do this by rigging a countershaft under the engine, with a rubber-tyred friction wheel, such as a small perambulator wheel, to engage the friction roller on the engine shaft, and this is perhaps the most practical and satisfactory method of starting for test purposes. It is, however, a more elaborate arrangement than many constructors will care to set up, and something simpler will probably be preferred. It is possible to drive the engine by means of a flat belt on the outside of the magneto flywheel, but as this surface is tapered, the belt will tend to run to the largest diameter and possibly slip off. A better method is to make a small vee pulley, about 2 in. to 2½ in. diameter, which can be attached to the flywheel hub by three screws, in the tapped holes provided for the magneto extractor. (Incidentally, I have found it advisable to open these holes out to not less than 2 B.A. or $\frac{3}{16}$ in. Whitworth, to enable stronger extractor screws to be fitted.) The groove of the pulley may be made with a 40 deg. included angle to take a standard ½-in. vee belt drive, and if the engine should be intended to drive eventually by vee belt, the pulley sheave should have a double groove so that the outer groove is available for a starting pulley while the belt is in position in the inner groove.

While the engine is being run in, the sparking plug should be removed, and ample lubrication supplied by feeding oil into the air intake. A convenient method of providing a continuous oil feed is to supply it through the carburettor, either by using the fuel tank, or by filling the float chamber at intervals. The oil should be thinned by mixing it with about four parts of petrol, to enable it to pass freely through the carburettor jet, and it may be found advisable to close the choke partially to ensure sufficient suction to maintain the feed. Under normal conditions, the engine should noticeably ease off in the course of running in, until at the end of two or three hours it will spin freely, and with no signs of tight spots; but it should be carefully watched, and if there is any tendency for it to become tighter instead of easier, the cause should be investigated immediately. Do not, under any circumstances, try to start up an engine that feels tight or "rough," under the idea that it will ease off when it warms up; the reverse is just as likely, or even more so, and irreparable harm may be done to an engine that seizes up early in its career. The first few hours in the running life of any two-stroke may decide its entire future success or

*Continued from page 219, "M.E.," August 16, 1951.



General arrangement of engine mounting for attachment to rear stays of pedal cycle (subject to modification to suit cycle frame shape and dimensions)

failure ■ ■n efficient working unit. I would point out here that it is very common for an engine to tighten up as ■ result of heat expansion when it is new ; this is not the same as ■ seizure, and does no harm if the engine is kept well lubricated and is shut down at the least sign of distress. In most cases it will ease off again in a few seconds, but if it remains tight after cooling down there is clearly something which calls for investigation in the mechanical system.

It is ■ very sound plan to strip the engine down after initial running-in, and examine carefully all bearing surfaces for the least signs of scoring, picking-up, or over-bright patches which suggest local tightness. If, however, everything appears to be perfectly free, this operation could be dispensed with, but the engine should be flushed through with normal petroil mixture to remove dirty oil and motored for ■ few minutes longer to get rid of excess liquid. The plug should now be screwed in, and the compression tested, making sure that the decompressor valve is closed. When the engine is turned towards top dead centre, it should feel distinctly "springy," and tend to return if released. Unless the compression is reasonably good, the engine can never be expected to run really efficiently ; it will be difficult to start, tend to run very hot, lose power at the least provocation, and have ■ heavy fuel consumption, under such conditions. But if it has been conscientiously built, according to the instructions given, there need be little fear that it will not go according to plan.

In the initial runs under power, only a very small throttle opening should be given ; the engine will probably four-stroke or fire intermittently under these conditions, but that is no cause for worry. It may be found necessary to close the choke partially or completely for a few seconds when starting from cold, but this should not be continued longer than is absolutely necessary. Do not attempt to open the throttle fully, even when satisfied that the engine is fully run in, without applying load of some kind. This may be provided by means of ■ fan brake, made of either wood or metal, roughly in the shape of an airscrew, about 24 in. diameter by 12 in. pitch, *and properly balanced.* It may be attached in the same way as the starting pulley, namely, by means of the three screws in the magneto hub. This will keep the engine cool and enable long continuous runs to be made at a speed of 2,500 to 3,000 r.p.m., which should be quite ■ comfortable speed for the engine "till the cows come home."

Attaching Engine to Cycle

Many readers have been impatient for details of the necessary fittings for attaching the engine to ■ cycle. There are, as I have already explained, many ways in which this can be done, and the following arrangement is not claimed to be "ideal," or even the most efficient possible method, but one which has been well tried and found quite practical, also adaptable to most types of cycles, and within the ability of most model engineers to construct.

It has been found, from ■ very careful survey of existing types of cycles, that there is no such thing ■■ standardisation of shapes or dimensions of frames, and this greatly complicates the problem of designing ■ "universal" form of engine attachment. Incidentally, I nearly got myself arrested for "loitering with intent" on one occasion, when making ■ systematic examination of ■ large number of cycles parked near ■ sports ground !

Another, and perhaps even greater, difficulty in the design of the attachment is due to the restrictions in the supply of materials at the present time. In some respects, this problem is insuperable, but it can be mitigated to some extent, by making the design adapatable to use different metals or sections of material, and this is what I have attempted to do in this case. Many constructors will find some modification of the arrangement shown to be desirable in their particular case, either to suit the materials or methods available, or some peculiarity in the design of the cycle. The particular type of rear brake fitted may introduce a further complication ; the older types of tension-rod operated brakes, which were fitted horizontally, do not affect the fitting of the engine attachment, but some modern cable-operated caliper brakes, which are fitted to the top of the rear stays, are liable to get in the way of the clamps which hold the engine. It is not by any means impossible, or even really difficult, to make suitable modifications to deal with these individual features ; but it will, I trust, be apparent to constructors that ■ standard, immutable form of mounting to cope with all possible eventualities, and at the same time to be perfectly sound and secure, would be very difficult to devise.

Construction of Mounting Bracket

The main constructional member of the attachment consists of ■ frame comprising two side plates of sheet metal, with cross members of rectangular section to rest across the rear stays of the cycle, where they are secured by clamps, the bolts for which are centrally disposed between the stay tubes. A pivot bolt, passing across the open end of this frame, forms the suspension for the engine, which is free to hinge about this centre, and means are provided for lifting it clear of the tyre, or holding it in firm contact with the aid of tension springs, as required.

The upper part of the side plates is shaped to form a saddle for the fuel tank, which is made cylindrical for the sake of convenience, as such ■ tank is fairly easy to fabricate, and holds a large quantity of fuel, in relation to the amount of material used in its construction. There is scope for aesthetic design in the shape of the tank, and indeed of the entire mounting arrangement, but this obviously does not affect utility, which is the primary aim of the basic design as shown here. The tank is held down by two straps of strip metal, each having an eye formed at one end, and a tension bolt attached to the other end. A cross-bolt is provided near the top of the frame, on which the eyes of the straps are threaded, and a similar cross-bolt, having two holes drilled diametrically through it, is fitted near the horns of the frame to take the tension bolts ; these members, incidentally, help to strengthen the frame structure.

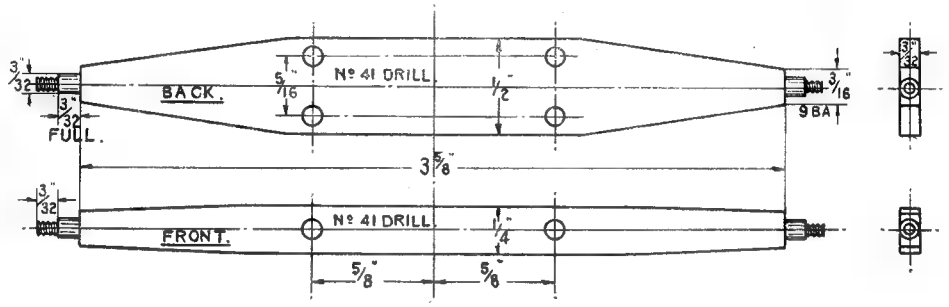
(*Continued on page* 302)

"L.B.S.C.'s" Beginners' Corner

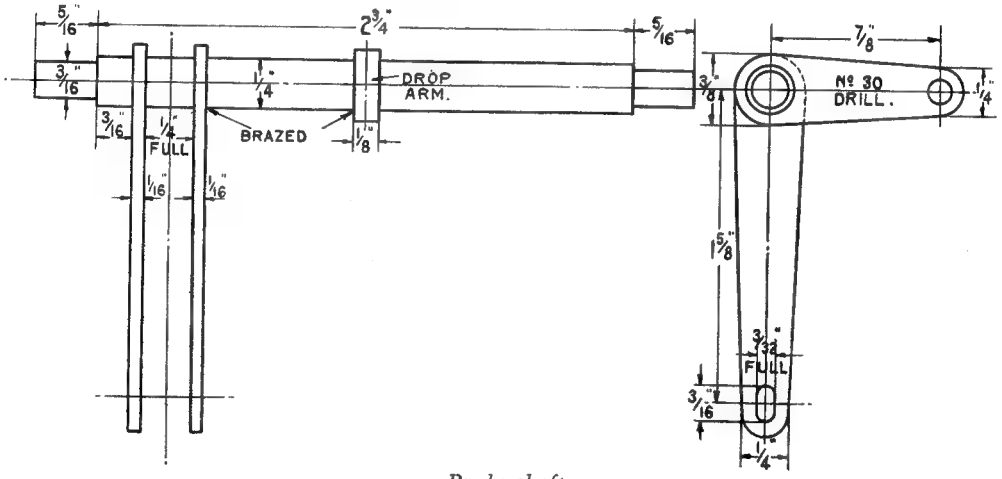
Brake Gear for "Tich"

AS previously mentioned, we are using ordinary brake beams, but with twin pull-rods to clear the pump ; so the next item will be the beams. These are different, inasmuch as the leading beam only has to provide for two pull-rod attachments, whereas the trailing beam has four ; but they are all made in exactly the same way. The leading beam needs a piece of flat mild-steel lathe catchplate will drive the tail of the carrier.

Whether chucked, or between centres, the turning job is the same. Turn down ■ bare 7/32 in. of the end, to 3/32 in. diameter, using ■ knife tool in the slide-rest ; then further reduce a full 3/32 in. length, to 5/64 in. diameter. If the piece is chucked, screw this small end with a 9 B.A. die in the tailstock holder ; if between



Brake beams



Brake shaft

¼ in. × 3/32 in., and the trailing beam ½ in. × 3/32 in., both pieces ■ little over 4 1/16 in. long. Chuck truly in four-jaw, if your lathe mandrel has a hole in it large enough to allow this to be done, with about ⅝ in. projecting beyond the chuck jaws. If not, the only thing to do, will be to turn the beams between centres. In that case, square off both ends of the piece of flat strip with a file ; carefully mark off the centre, make ■ centre-punch mark, and drill it with the smallest-sized centre-drill that you have available. Put ■ small dog or carrier on the end, and put the piece between centres, so that the pin in the centres, leave it as it is for the moment. Now reverse the beam, whether chucked or between centres ; if the latter, naturally you'll have to change ends with the carrier as well ; then ditto repeato operations on the other end of the beam, making sure that the distance between the shoulders, is 3⅝ in. ■ shown in the illustration. If the beams have been turned between centres, the extreme ends can now be screwed with ■ 9 B.A. die in an ordinary hand-operated die stock. Put the beam vertically in the vice jaws, and take mighty good care to hold the die stock absolutely horizontal, when starting to cut the thread. Work

it back and forth carefully, and don't forget ■ drop of cutting oil, which will ensure clean threads.

The holes for the pins holding the pull-rod forks to the beams, are drilled $\frac{5}{8}$ in. each side of the centre of the beams, using No. 41 drill. On the front or narrower beam, they are located on the longitudinal centre line; on the back, or wider beam, they are 5/32 in. ahead and behind the centre line, that is, at $\frac{5}{16}$ in. centres, as can be seen in the illustration. Smooth off any burring, then put the beams in position between the hangers, the reduced ends going through the holes at bottom of same; don't bend the hangers when erecting the beams, but just slack the upper hanger nuts sufficiently to allow the ends of the hangers to go over the beams. Use 9-B.A. commercial nuts and washers to keep the hangers in place on the ends of the beams.

Brake Shaft Assembly

To make the brake shaft, ■ piece of $\frac{1}{4}$ in. round mild-steel, a little over $3\frac{3}{4}$ in. long will be required. Chuck this in the three-jaw; it doesn't matter much if it isn't exactly "spot on," so don't waste time in setting it to run truly with ■ dial test indicator—life's too short! Face the end, and turn down $\frac{5}{16}$ in. of the end, to $\frac{3}{16}$ in. diameter. Reverse in chuck, and ditto repeato operations on the other end, making sure that the distance between the shoulders is $2\frac{3}{4}$ in. That part is soon settled!

Next, make the arms. The drop arm, which actuates the pull-rods and beams, is filed up from ■ piece of $\frac{1}{8}$ in. × $\frac{3}{8}$ in. flat mild-steel. Put a couple of centre-dots on it at $\frac{7}{8}$ in. centres, drill them both No. 30, then enlarge one of them with ■ 15/64 in. or letter C drill. Then file up the drop arm to the shape shown, around the holes; I guess you've all heard of the Irish cooper, Tim O'Harrigan, who built a barrel around the bung-hole so that he got it in the right place—well, there's something in that! You'll find that your $\frac{1}{4}$ in. parallel reamer has a slight lead at the business end; if that won't enter the larger hole, enlarge the hole slightly until it will, then carefully ream the hole until the drop arm can be driven or pressed on to the shaft. Note, it doesn't need ■ "press fit" in the generally-accepted sense of the term; the drop arm just needs to be able to "stay put" while being brazed.

The two actuating arms are made in ■ similar manner, using $\frac{3}{8}$ in. × $\frac{1}{16}$ in. flat mild-steel, and drilling two No. 40 holes at $1\frac{1}{8}$ in. centres. Clamp or solder the two bits of steel together, and drill them both at once; then file to shape. Enlarge the hole at the bigger end, to a tight fit on the shaft, as described above; slot the smaller one with ■ $\frac{1}{8}$-in. rat-tail file, until it is $\frac{3}{16}$ in. long. Before mounting these on the shaft, the brake nut must be made, as it goes between them. For this, ■ piece of $\frac{1}{4}$ in. square rod will be needed. On full-size engines, the nut is made from hard bronze, ■■ it has to do considerable work, and is square-threaded, to suit ■ similar thread on the brake spindle. On the little engine, bronze should be used if available; but as the brake is more for ornament that use, brass will do, and ordinary Whitworth or B.A. threads are quite suitable. Chuck the rod truly in four-jaw, face the end, and turn down 3/32in. length to 3/32 in. diameter. Part off at a bare $\frac{3}{8}$ in. from the shoulder; reverse in chuck, and turn ■ similar pip on the other end, leaving $\frac{1}{4}$ in. between the shoulders. Make ■ centre-pop right in the middle of one of the facets; drill it No. 40, and tap it $\frac{1}{8}$ in. or 5 B.A.

The brake shaft is supported in two oval-headed bearings attached to the frames. Use bronze if available, but brass will do if there is nothing better to be had, as the wear is negligible. They can be turned from a piece of $\frac{5}{8}$ in. round rod held in the three-jaw. Face the end, and turn down $\frac{3}{16}$ in. length to $\frac{5}{16}$ in. diameter, ■ good fit for the holes previously drilled in the frames. Centre, and drill to $\frac{5}{16}$ in. depth with No. 12 drill; then part off at ■ full 3/32 in. from the shoulder. File the flange to an oval shape ■■ shown, then drill the two screwholes at $\frac{1}{2}$ in. centres, with No. 48 drill. Rechuck by the round part, and take ■ facing skim off the flanges with ■ round-nose tool set crosswise in the rest.

How to Erect the Shaft

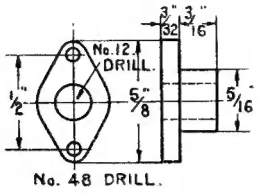
First set the two actuating arms in position on the shaft. The inner one is set at $\frac{1}{8}$ in. from the shoulder; take a look at the illustration, and you'll see the exact spot at which to put it. The other one is pressed on to line up with it; but before setting it in exact position, put the brake nut between the ends, the pips on either side of the nut going through the oval holes in the ends of the arms, as shown in the end view of the assembled gear in the previous instalment. Then press on the other arm, until the brake nut is just held between the arms, free to turn, but without any slackness. See that the drop arm is in the middle of the shaft, then set it so that it is at right-angles to the actuating arms; once again, there is no need for "mike measurements," and if you set them by eye alone, it will be quite O.K. The drop arm should hang down when the actuating arms are to your left and pointing towards you; see illustration.

The actuating and drop arms can then be brazed to the shaft; simply anoint the joints with ■ little wet flux—Boron compo or similar—blow to bright red, and touch the joints with a piece of soft brass wire, which will melt and run around to form a fillet. Silver-solder may be used instead of brass wire, in which case either borax can be used as ■ flux, or any special kind, such as "Tenacity," according to the grade of silver-solder used. A coarse grade is quite suitable for such jobs as this. Quench in water only, and clean up with fine emery-cloth or similar abrasive.

Erection is easy; insert the ends of the shaft through the holes in the frame, which can be readily done if the plain end of the shaft is pushed through the hole in the right-hand frame from the inside. Hold each reduced end of the shaft in line with the middle of the hole in the frame, then push the end of the bearing through the hole, so that the end of the shaft enters the hole in the bearing; see the plan view in the last instalment. Set the bearing flange parallel with the slope of the frame, run ■ No. 48 drill through the holes, making countersinks on the frame, follow with No. 53 drill, tap 9 B.A., and put screws in to suit. Any heads will do; use whatever is available.

Brake Column and Spindle

The hand brake column may be made from ½ in. round or hexagon brass rod, or from a casting if available. A piece of rod a full 2½ in. length is needed ; chuck this in the three-jaw, face the end, centre, and put a No. 30 drill in, to the full depth of the fluted part of the drill.



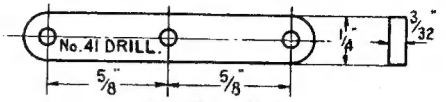
Brake shaft bearing

Keep withdrawing it, and clearing the chippings out of the flutes, otherwise they will choke, cause the drill to seize in the hole, and probably break it. Turn down ½ in. of the outside, to ¼ in. diameter, and screw it ¼ in. × 40. Reverse in chuck, face the other end, centre, and put the No. 30 drill in, until it breaks into the hole first drilled, forming a continuous hole right through the full length of the rod.

Next make a ¼ in. × 40 tapped bush, from any oddment of rod over ⅜ in. diameter, and ⅜ in. long or over ; you don't need any instruction for that simple job, as I have already described it more than once. After running the tap in, and skimming any burr off the end, screw the embryo brake column into it, and bring up the tailstock, with a centre point in the hole in the barrel, until the point enters the hole in the outer end of the drilled rod. If the tailstock barrel is now locked, and the tailstock locked to the lathe bed, the column will be firmly supported at both ends, and can be turned without chatter. Don't forget a spot of oil at the tailstock centre. Set over the top slide a weeny bit, and take a cut along the rod. If your top slide has a graduated base, set it over 2 deg., and it will turn the taper on the column exactly right, so that when the smaller end is down to ¼ in. diameter, the larger end, just against the shoulder, will be ⅜ in. diameter. If a round-nose tool is used, the radius at the end of the cut will be formed automatically. If your top slide hasn't a graduated base, it is a case of trial and error. A tin setting template could be made, but it isn't worth the trouble, especially as the taper is merely ornamental, and the exact degree doesn't matter a Continental. If the turning tool leaves marks and scratches along the taper, clean them out with a piece of fine emery-cloth, or similar abrasive, for neatness sake, as the column is in view on the footplate.

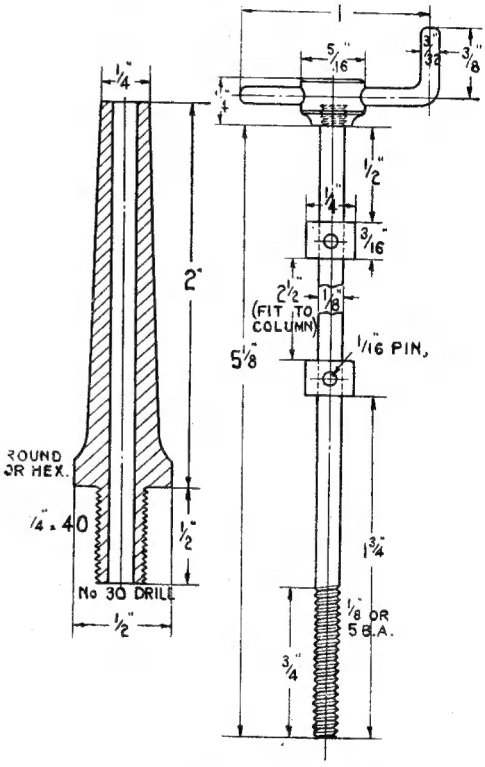
The brake spindle is made from a piece of ⅛ in. round steel approximately 5½ in. long. Chuck in three-jaw, and put ⅛ in. of thread, ⅛ in. or 5 B.A., one one end. Reverse in chuck, and put ⅛ in. of thread of same pitch, on the other end. Chuck a bit of 5/16 in. round steel in three-jaw ; face the end, centre, drill down about 5/32 in. with No. 40 drill, and tap ⅛ in. or 5 B.A., same as the spindle. Put a curved chamfer on the edge with a round-nose tool, and part off at ¼ in. from the end. Screw this tightly on to the end of the brake spindle ; shorter-threaded end, of course. Then chuck the brake spindle with the boss close to the chuck jaws, face off the end, and slightly chamfer it, both for appearance sake, and so that a sharp edge doesn't cut your fingers.

The next item is to drill a No. 43 hole slap across the centre of the little boss, and take care



Equalising link

to have this right ; because if the cross-handle goes through to one side, it will look what the kiddies call "worse 'n awful"—they always have a name for it, bless their hearts ! If you rest the boss in a vee-block, the drill can be "sighted"



Brake column and spindle

outside the boss ; all I do, is to pull down the handle of the drilling machine, so that the drill comes down in front of the boss, and goes straight into the tip of the groove in the block. If it doesn't, simply shift the block until it does. Don't move the block any more, but move the boss along the groove in the block, until the drill, when pulled down, enters the centre-pop in the boss. Start the drilling machine, pull down the handle steadily, and Bob's your uncle. In passing, a simple job like drilling a hole exactly where

you want it, seems to stump the very folk you would imagine to be experts at it. I repaired a professionally-made engine for a friend. The engine was only a 2½-in. gauge job, and cost a three-figure price, back in the cheaper days; and believe it or not, as Ripley says, fully 40 per cent. of the holes in the frames had been filed oval, or otherwise enlarged, because they were originally drilled in the wrong place. Anyway, when you have drilled your hole truly through the boss, drive in a piece of 3/32-in. silver-steel. Cut off one end at ½ in. from centre; bend up the other, also ½ in. from centre, and cut off at ⅜ in. above the bend. Round off the cut ends nicely with a file, and the result should be as shown in the illustration.

To make the collars, chuck a piece of round rod in the three-jaw; ¼ in. diameter brass or steel will do. Face, centre, and drill No. 32 for about ½ in. down. Turn down a full 3/16 in. length to 7/32 in. bare diameter, and part off a 3/16 in. slice; face the end again, and part off another 3/16 in. slice, the full ¼ in. diameter. Ream both collars slightly until they fit tightly on the brake spindle. Put on the larger one, setting it at ½ in. below the handle; drill a No. 53 hole through collar and spindle, and squeeze in a bit of 1/16 in. wire, filing flush both sides. Smear the spindle with a taste of oil, put it down the column, and put on the smaller collar, adjusting same so that the spindle turns freely but cannot move up or down; then pin the collar to the spindle, as above mentioned.

Erecting and Connecting Up

At 5/16 in. from the inner edge of the top of the back buffer beam, and exactly above the brake nut—that is, at 2 3/16 in. from the left-hand end of the beam—drill either a ¼ in. clearing hole, or a 7/32 in. hole, tapping the latter ¼ in. × 40. Put the bottom end of the brake spindle through the hole, and enter it into the brake nut, screwing about halfway through; note, if a clearing hole has been drilled, a ¼ in. × 40 nut, made from 5/16 in. hexagon rod, must be slipped over the brake spindle underneath the beam, before entering it into the brake nut. The screwed spigot of the brake column is then poked through the hole in the beam, and secured with the ¼ in. × 40 nut. If the hole in the beam has been tapped, simply screw the spigot into it.

All that remains, is to connect up; for this, ten forks are needed, and five pieces of 3/32 in. round steel, for pull-rods. The forks are made from ¼ in. square brass or steel rod, as you fancy; same process as described for valve gear forks, so you can call on your acquired experience for that job. Make nine of them to the sizes given in the last instalment, but make the slot in No. 10, ⅛ in. wide, to fit over the drop arm, and drill it No. 30, to take a ⅛ in. bolt for attaching it to same. An equalising link is also needed, but this is only a few minutes' work. It is merely a piece of ¼ in. × 3/32 in. flat steel strip, 1½ in. long, with two No. 41 holes drilled in it at 1¼ in. centres, and the ends rounded off. A third No. 41 hole is drilled in the middle.

Starting from the back, the main pull-rod is a piece of 3/32 in. rod, 1 in. long, with ⅛ in. of thread (3/32 in. or 7 B.A.) on each end. The wider-jawed fork is screwed on to one end of the rod; and on the other, one of the narrower-jawed forks, which is pinned to the centre of the equalising link by a bit of 3/32 in. silver-steel squeezed through fork and link. The two short pull-rods are 1 7/16 in. long, screwed ⅛ in. full at both ends, and furnished with forks. These are attached to the ends of the equalising link, and the trailing beam, by 3/32 in. pins, as mentioned above. If the wide-jawed fork is attached to the drop arm by a ⅛-in. bolt—bit of ⅛ in. round steel, screwed and nutted at both ends, as in the valve gear—and the brake handle turned, the rear brakes should go on and off nicely.

Now cut two 3⅝ in. lengths of 3/32 in. rod, screw as above, and put a fork tightly on one end, pinning same to the leading beam. Screw the forks on the other end finger-tight, and couple up to the trailing beam temporarily with loose-fitting pins. Operate the brake handle. If the rear brakes come on first, screw up the forks a little more; if the front brakes come on first, unscrew a shade. When all four blocks come on together, the adjustment is correct, and you can either pin the forks to the trailing beam as above, or open the holes in the forks to No. 41 size, and use 3/32 in. bolts, made in the same way as the drop-arm bolt. The latter makes any subsequent adjustment easy to carry out; but as the brakes are only for ornament, or to keep the engine from running away when left standing unattended, it is a really unnecessary refinement.

Petrol Engine Topics

(*Continued from page 298*)

The device for raising and lowering the engine comprises a small crank, working in a bush attached to one of the side plates, and operated by a short hand lever. A bolt, similar to the main pivot bolt, and fitted opposite to it in the lugs of the main bearing housing, takes a small U-shaped stirrup, to which is attached a tension bolt, working on the lifting pin in the crank disc. The cross-bolt also serves as an anchorage for the hooks of two tension springs, the lower ends of the latter being attached to clamps which embrace the lower part of the rear stays. This arrangement gives a very wide range of adjustment in all ways; first, by the positioning of the bracket assembly on the rear stays of the cycle, secondly, by the adjustment of the lock nuts on the tension bolt, and thirdly, the pressure of the friction roller on the tyre can be varied by shifting the spring anchoring clamps up or down the stays, or by changing the springs.

It is possible to arange the lifting gear so as to press the engine positively down on the tyre instead of relying on spring pressure, but I have generally found the methods illustrated to be most satisfactory under general working conditions.

(*To be continued*)

CONSTRUCTING A $\frac{1}{4}$-in. DRILL CHUCK

by A. Smith

DRILL chucks, particularly those of the spring type, are easily available and quite cheap to buy, except on Sundays! And it was on such a day that the milling and drilling spindle, described in a recent issue of THE MODEL ENGINEER, was finished. It now lay complete but inactive for the want of a chuck. It was, therefore, decided to manufacture a $\frac{1}{4}$-in. drill chuck from existing material, using an existing chuck on a hand drill as a basis of design.

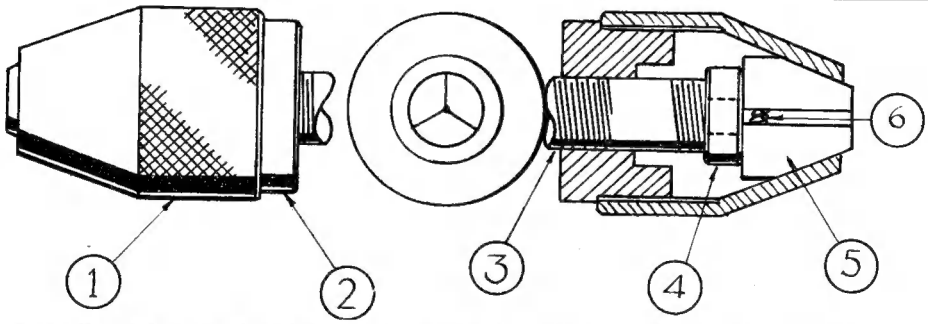
Body. Part No. 1

This started as a short end from a bar of $1\frac{1}{4}$ in. diameter mild-steel. The end was faced and a length of $1\frac{1}{4}$ in. turned down to $1\frac{1}{16}$ in. diameter. The end centred and drilled $\frac{3}{8}$ in. for a depth of $1\frac{3}{8}$ in., and bored out to 0.825 in. for a depth of $\frac{5}{8}$ in. and screwcut $\frac{7}{8}$ in. by 26 t.p.i. The outside is then knurled or it may be grooved a number of times with a narrow parting tool, which will be found to give sufficient grip to operate the chuck. The body may now be parted off to a length of $1\frac{1}{4}$ in.

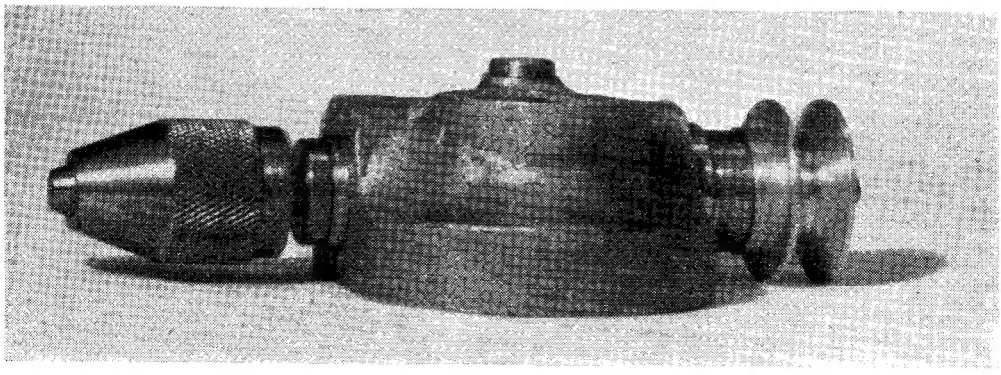
The taper portions, both internal and external, are left until the back, which is the next component, has been machined to a sufficient state to act as a screwed mandrel to carry the body for taper boring.

Back. Part No. 2

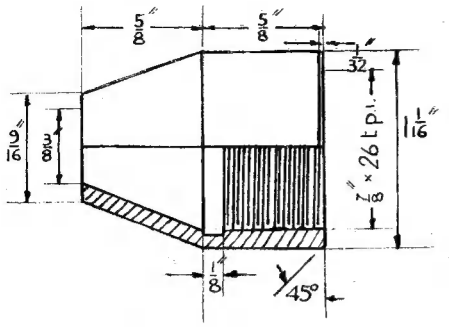
This was a further length of $1\frac{1}{4}$ in. bar. It was gripped in the chuck, faced, centred and drilled 21/64 in. for a depth of 1 in. and tapped $\frac{3}{8}$ in. by 26 t.p.i., using the taps in the tailstock chuck. The outside was then turned down to 1 in. diameter for a distance of $\frac{5}{8}$ in., and the first $\frac{7}{16}$ in. of this further reduced to $\frac{7}{8}$ in. diameter. This portion was screwcut $\frac{7}{8}$ in. by 26 t.p.i. making use of the body as a gauge. A firm screw fit should be aimed at, otherwise a sloppy chuck will be the result. Two $\frac{1}{8}$ in. portions are relieved as shown in the detail drawing to ensure the



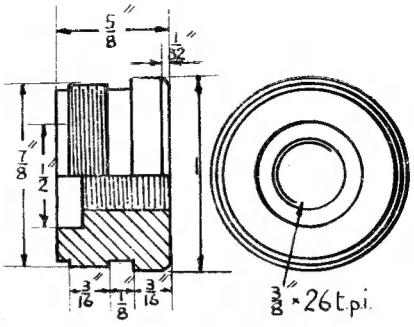
Parts list of drill chuck. (1) *body*; (2) *back*; (3) *spindle*; (4) *thrust collar*; (5) *jaws*; (6) *spring*



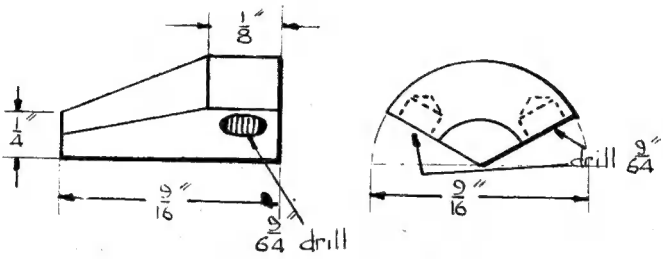
An M.L.7 milling and drilling spindle, fitted with drill chuck



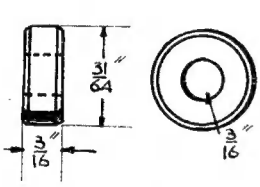
Body, mild-steel



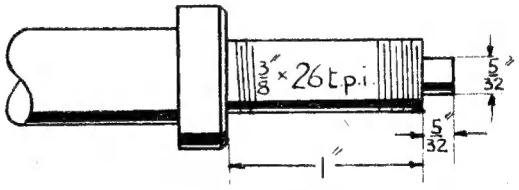
Back, mild-steel



Jaws, mild-steel, case-hardened



Thrust collar, mild-steel, case-hardened



End of spindle

back going snugly home into the body. A $\frac{1}{8}$ in. length of the screwed hole is opened out to $\frac{1}{2}$ in. diameter to carry the thrust collar.

Before parting off the back, it should be made use of as a mandrel to carry the body for boring out the taper and finish turning the outside.

The actual taper used is not crucial except that it must be exactly similar to that employed in making the jaws. If the top-slide is set over for this operation, the jaws should be made next, while the setting remains undisturbed.

Jaws. Part No. 5

It was the original intention to make these from three short lengths of hexagonal bar, but none being available a piece of $\frac{3}{4}$-in. diameter steel bar was used with every success. This was faced, turned down to $\frac{9}{16}$ in. diameter, and taper turned to suit the interior of the body. A 1/32 in. hole was then drilled up the centre.

Making use of the lathe back gear wheel for dividing, three lines were marked forming the three individual jaws. Careful work with a very fine saw resulted in the three separate jaws. They were then carefully centre-punched and drilled 9/64 in. for the springs, and finally deeply case-hardened.

Thrust Collar. Part No. 4

This was a simple piece of lathe work in mild-steel, case-hardened to resist wear.

The end of the spindle (Part No. 3) is machined as shown, and three springs (Parts Nos. 6) $\frac{1}{8}$ in. outside diameter by $\frac{1}{2}$ in. long wound up from 22-s.w.g. piano wire *a la* "L.B.S.C." completes the work.